National Park Service
U.S. Department of the Interior

Natural Resource Stewardship and Science

# Annual Climate Summary 2007

## *Central Alaska Network*

Natural Resource Data Series NPS/CAKN/NRDS—2012/244

**ON THE COVER**
**Climate station at Upper Charley River Yukon-Charley Rivers National Preserve**
Photograph by: NPS Photo by Pam Sousanes

# Annual Climate Summary 2007

*Central Alaska Network*

Natural Resource Data Series NPS/CAKN/NRDS—2012/244

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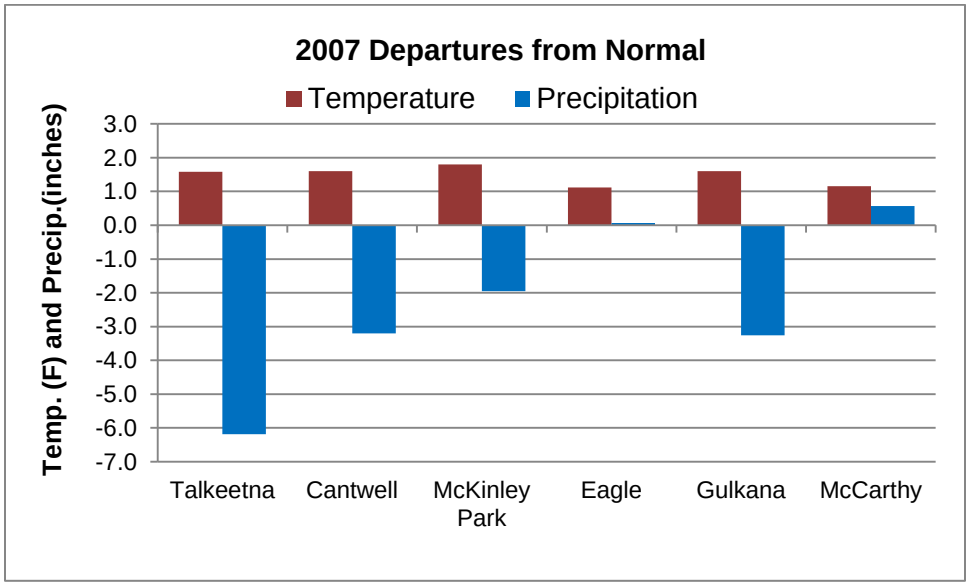
# Executive Summary

Using methodologies developed for the Central Alaska Network (CAKN), climate was monitored at existing National Weather Service stations and new CAKN climate stations in and around Denali National Park and Preserve, Wrangell -St. Elias National Park and Preserve, and Yukon-Charley Rivers National Preserve. The mean annual temperatures around the CAKN region in 2007 were above normal for all sites except for Yakutat along the Gulf of Alaska. Most sites had warmer than normal summers and extremely variable winter temperatures. Annual temperatures averaged across the state of Alaska during 2007 ranked 15th warmest since 1918. Winter temperatures in 2007 were above average for the 8th consecutive year. Annual precipitation totals throughout the network were below normal for most of the sites except for McCarthy and Eagle which were close to normal. The snowpack for most of the CAKN region was between 50 and 70% of normal for the 2006-2007 season. The exception was the Chugach and Wrangell mountain ranges in WRST where the snowpack was closer to normal, and the southeast area of WRST where the snowpack was 130 to 150% above normal.



# Introduction

Denali National Park and Preserve, Wrangell–St. Elias National Park and Preserve, and Yukon-Charley Rivers National Preserve make up the Central Alaska Inventory and Monitoring Network (CAKN), covering over 21 million acres. Climate is considered to be the most important broad-scale factor influencing ecosystems. Because global climate models indicate that climate change and variability will be greatest at high latitudes, climate monitoring will be critical to understanding the changing conditions of park ecosystems. A summary of the CAKN climate characterization is presented first followed by the methods and climate summary for 2007.

The CAKN climate monitoring program deployed sixteen new climate stations between 2003 and 2005, mostly at higher elevations, to capture elevational and latitudinal climate gradients within the parks, and to capture data in areas where there were no baseline references. The monitoring protocols, which included the site selection process, were completed in 2004 (Sousanes 2004). The data summaries for this annual report are based on the long-term National Weather Service cooperative sites in and around the CAKN parks that have been in operation for 26 to 84 years. The new sites are analyzed for comparison, but long-term trends will take time to develop. This is the fourth in a series of reports for the CAKN Climate Monitoring Program.

### Central Alaska Network Climate Characterization

The central Alaska climate can be characterized by the three major climate regimes that span from the southern boundaries of the network along the coast to the interior. The southern coast of Wrangell-St. Elias is significantly affected by the Gulf of Alaska. The Pacific Ocean moderates the temperature along the coast in both summer and winter, and brings a considerable amount of precipitation to the coastal areas and the southern flanks of the mountain ranges, including the Chugach and St. Elias Ranges that ring the Gulf Coast. Just north of these mountain ranges the precipitation tapers off and seasonal temperatures are more extreme. The winters are cold and the summers can get hot. The CAKN areas farthest north, and the farthest from the coast, are true interior climates characterized by low annual precipitation and large seasonal variation in temperature.

The climate of Alaska is affected by solar radiation, atmospheric gases (volcanic eruptions, $CO_2$), the water temperature of the Pacific Ocean, and ocean currents. These large scale processes drive changes in atmospheric patterns, like the repositioning of the polar jet stream and the Aleutian low pressure system or the frequency of La Nina's and El Nino's (Papineau 2003). Each of these can affect the regional patterns of storm tracks, prevailing winds, snowfall amounts, and the extent of sea ice (ACIA 2004).

There are several large-scale climate patterns and indices that are of particular interest to Alaska, including the Pacific Decadal Oscillation (PDO), which is an index of sea surface temperatures in the North Pacific Ocean. Typical winter sea surface temperatures during the warm phase of the PDO are warmer off of the Gulf Coast of Alaska moderating air temperatures over Alaska (Hartmann and Wendler 2005). The PDO seems to cycle through a warm and cool phase every 20 -30 years, 2007 marks the $30^{th}$ year that the PDO has been in a warm phase. Temperature

trends that have shown climatic warming tend to be strongly biased by the sudden shift in 1976 from the cooler regime to a warmer regime (Figure 1).

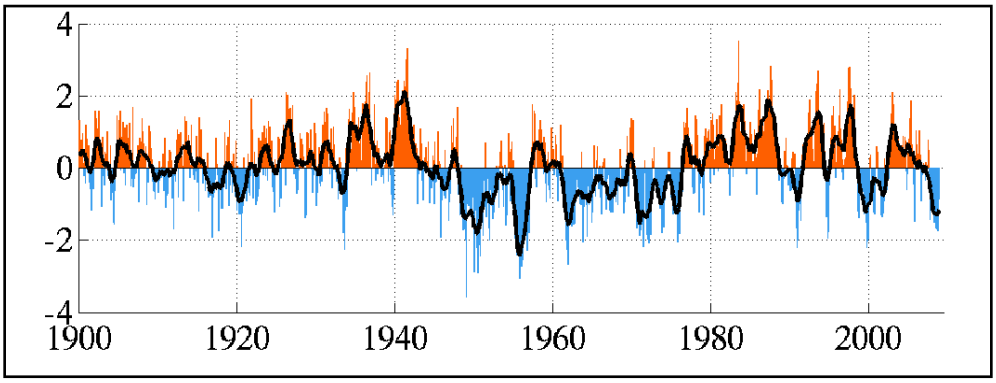



Figure 1. Graph showing PDO index for sea surface temperatures highlighting warm and cool phases courtesy of JISAO, 2008.

While the North Pacific Ocean variability seems to explain some of the temperature trends in the region, the Arctic Ocean, and in particular the extent of sea ice will likely influence both temperature and precipitation patterns in Alaska. In recent years there has been a continued significant reduction in the extent of the summer sea ice cover and the decrease in the amount of relatively older, thicker ice (NSIDC, 2008). Models have predicted that the retreating sea ice should affect the temperature and ecosystems of adjacent lands. An increase in the amount of energy absorbed by vegetation and its transfer to the atmosphere, will contribute to the further high-latitude amplification of climate warming (Chapin et al. 2005).

# Methods

Data were compiled from seven long-term climate stations with the most complete records nearest the three CAKN parks that represent the major climate regimes in the network (Table 1). These stations have long enough records to compare 2007 data with the latest normal period, 1971-2000. For these sites temperature, precipitation, and snowfall are compiled. The monthly means are simple arithmetic averages computed by summing the monthly values for the period 1971-2000 and dividing by thirty. Prior to averaging, the data are adjusted if necessary to compensate for data quality issues, station moves or changes in station reporting practices. Missing months are replaced by estimates based on neighboring stations.

Table 1. Locations and elevations of long-term sites in CAKN used for data analysis.

| *Name* | *Lat* | *Long* | *Elev. (ft)* | *Network* | *Start* | *End* | *Park* |
|---|---|---|---|---|---|---|---|
| Eagle | 64.7666 | -141.2000 | 850 | COOP | 1949 | Present | YUCH |
| McKinley Park | 63.7195 | -148.9656 | 2060 | COOP | 1925 | Present | DENA |
| Cantwell | 63.4000 | -148.9000 | 2150 | COOP | 1983 | Present | DENA |
| Talkeetna | 62.1800 | -150.0600 | 350 | COOP | 1949 | Present | DENA |
| McCarthy | 61.4166 | -143.0000 | 1250 | COOP | 1984 | Present | WRST |
| Gulkana | 62.1502 | -145.4500 | 1580 | SAO | 1949 | Present | WRST |
| Yakutat | 59.5000 | -139.6700 | 30 | SAO | 1936 | Present | WRST |

Five additional sites are analyzed to try and capture winter temperature inversions and climate deviations at higher elevations (Table 2). Monthly means and annual totals were compiled for the newer CAKN stations including, temperature, wind, relative humidity, solar radiation, snow depth, and summer rainfall (Figure 2). Most of the summaries, analysis, charts, and graphs from NOAA and NRCS are in standard units; in order to standardize units throughout the report data are presented in standard units. Period of record averages for the long-term sites are available in Appendix A, and extremes and records for these sites are listed in Appendix B.

Table 2. Locations and elevations of the new CAKN sites and existing RAWS sites.

| *Name* | *Lat* | *Long* | *Elev. (ft)* | *Network* | *Start* | *End* | *Park* |
|---|---|---|---|---|---|---|---|
| Stampede | 63.7478 | -150.3281 | 1800 | CAKN RAWS | 2003 | Present | DENA |
| Toklat | 63.5255 | -150.0465 | 2920 | CAKN RAWS | 2005 | Present | DENA |
| Eielson Visitor Center | 63.4307 | -150.3102 | 3730 | CAKN RAWS | 2005 | Present | DENA |
| Wonder Lake | 63.4900 | -150.8800 | 2119 | RAWS | 1995 | Present | DENA |
| Dunkle Hills | 63.2670 | -149.5415 | 2651 | CAKN RAWS | 2003 | Present | DENA |
| Coal Creek | 65.3041 | -143.1570 | 820 | CAKN RAWS | 2004 | Present | YUCH |
| Upper Charley | 64.5169 | -143.2023 | 3654 | CAKN RAWS | 2005 | Present | YUCH |
| Chicken Creek | 62.1240 | -141.8473 | 5260 | CAKN RAWS | 2004 | Present | WRST |
| Chisana | 62.0775 | -142.0500 | 3320 | RAWS | 1988 | Present | WRST |
| Chititu | 61.2735 | -142.6209 | 4554 | CAKN RAWS | 2004 | Present | WRST |
| May Creek | 61.3208 | -142.5844 | 1650 | CAKN RAWS | 1990 | Present | WRST |
| Gates Glacier | 61.6029 | -143.0132 | 4060 | CAKN RAWS | 2005 | Present | WRST |
| Klawasi | 62.1469 | -144.9269 | 3100 | RAWS | 1991 | Present | WRST |
| Tebay | 61.1810 | -144.3392 | 1880 | CAKN RAWS | 2005 | Present | WRST |
| Tana Knob | 60.9080 | -142.9013 | 3739 | CAKN RAWS | 2005 | Present | WRST |

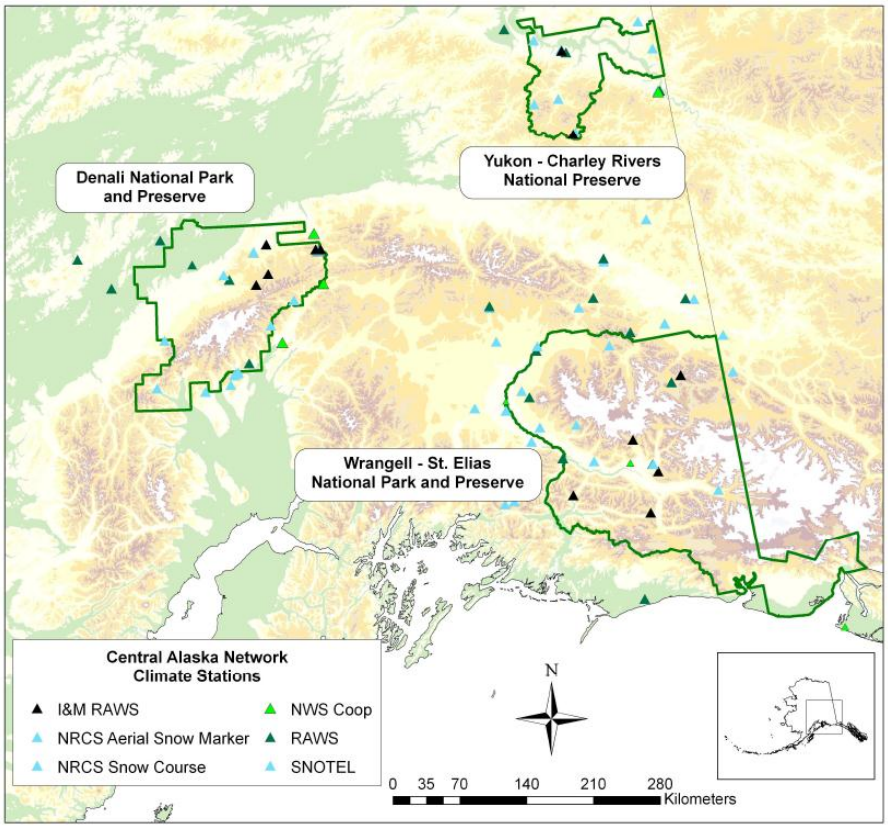



Figure 2. Map of newer CAKN climate stations.

# Results

## Climate Year 2007 Synopsis

The mean annual temperatures around the CAKN region in 2007 were above normal for all sites except for Yakutat along the Gulf of Alaska. Most sites had warmer than normal summers and extremely variable winter temperatures. Eagle had a record warm July and many of the sites had record cold average temperatures for March. Annual precipitation totals throughout the network were below normal for most of the sites, except for McCarthy and Eagle which were close to normal (Figure 3). Yakutat had the driest summer on record, while Eagle had the wettest August on record. Precipitation, in the interior came mostly from localized convective-type showers, and the totals varied for different locations across the area.

2007 was the 10th warmest year on record for the U.S. with a nationally averaged temperature of 54.2°F. This value is 1.4°F above the 20th century (1901-2000) mean (NOAA 2008). Annual temperatures averaged across the state of Alaska during 2007 ranked 15th warmest since 1918 (Figure 4). Winter temperatures in 2007 were above average for the 8th consecutive year. Spring was slightly below average, summer was warmer than average, and fall was significantly warmer than the 1918-2000 average (Figure 5) (NOAA 2008). Wildfires across Alaska were not as widespread as in recent years, with the exception of the Anaktuvuk River wildfire, which set a new record for the largest fire on the North Slope.

The snowpack for most of the CAKN region was between 50 and 70% of normal for the 2006-2007 season. The exception was the Chugach and Wrangell mountain ranges in Wrangell –St. Elias (WRST) where the snowpack was closer to normal, and the southeast area of the park where the snowpack was 130 to 150% above normal. The southeast region of Alaska also had record breaking snowfall this season. The warm interior temperatures in April led to a rapid deterioration of what little snowpack did develop. The snow was off the ground by May 1 in almost all regions of the interior even along the southern flanks of the Alaska Range which is unusual. This was not the case for the southeastern portion of WRST where spring arrived late. Figure 6 shows the statewide snowfall development from March through May (NRCS 2007).

The El Niño Southern Oscillation (ENSO) began 2007 in a weak warm phase (i.e., weak El Niño), which started in the fall of 2006. The El Niño warm event peaked in December and began to deteriorate in January. Neutral ENSO conditions were documented through most of the summer. By the end of summer a La Niña event developed and sea surface temperatures in the equatorial Pacific started to cool (NOAA 2008) The PDO index for 2007 was variable with a negative anomaly in March followed by positive departures for the summer months, and trending back towards negative departures during the fall and early winter (JISAO 2008).

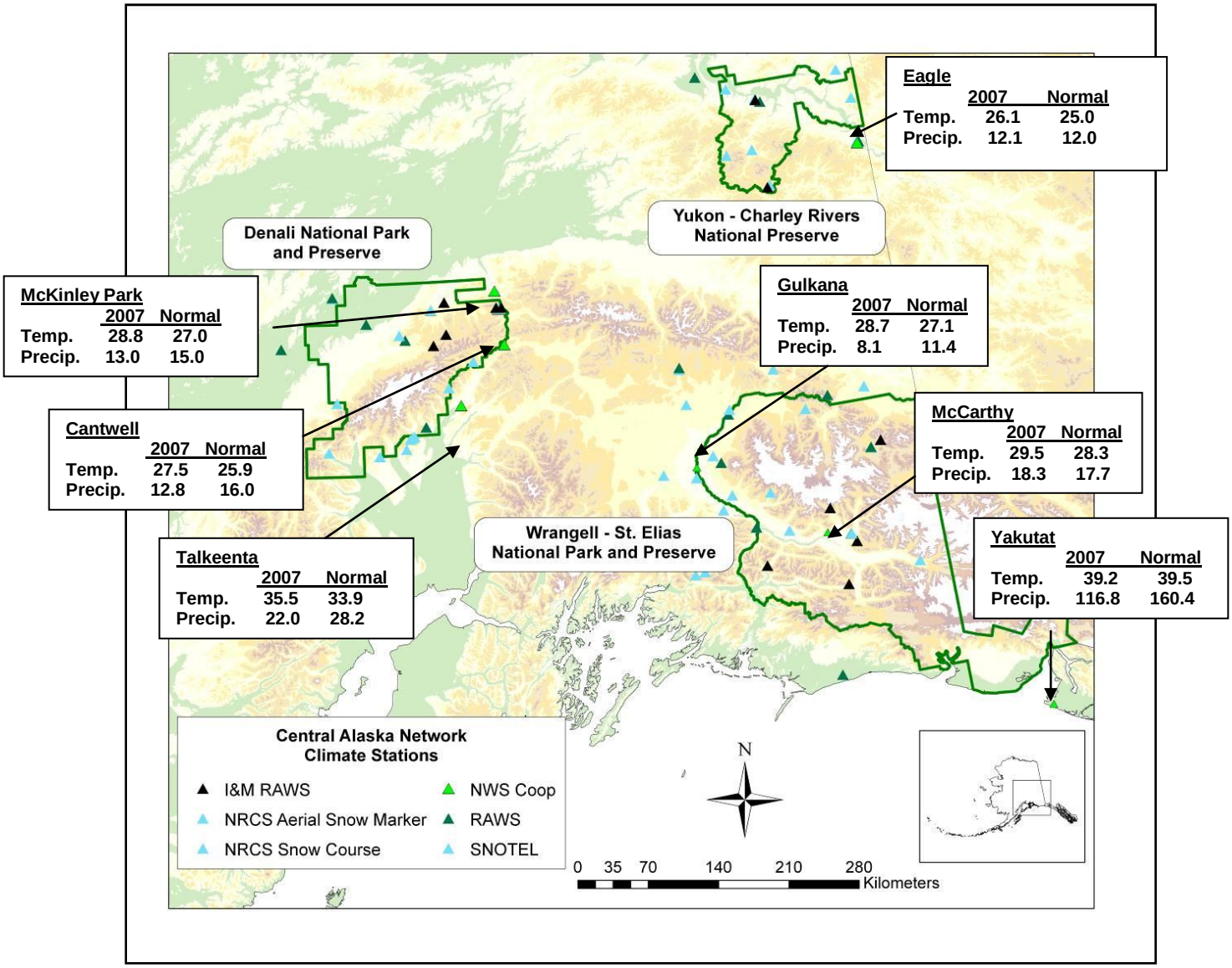



Figure 3. Mean annual temperature and precipitation totals for long-term sites in CAKN for 2007 compared with 1971-2000 normals.

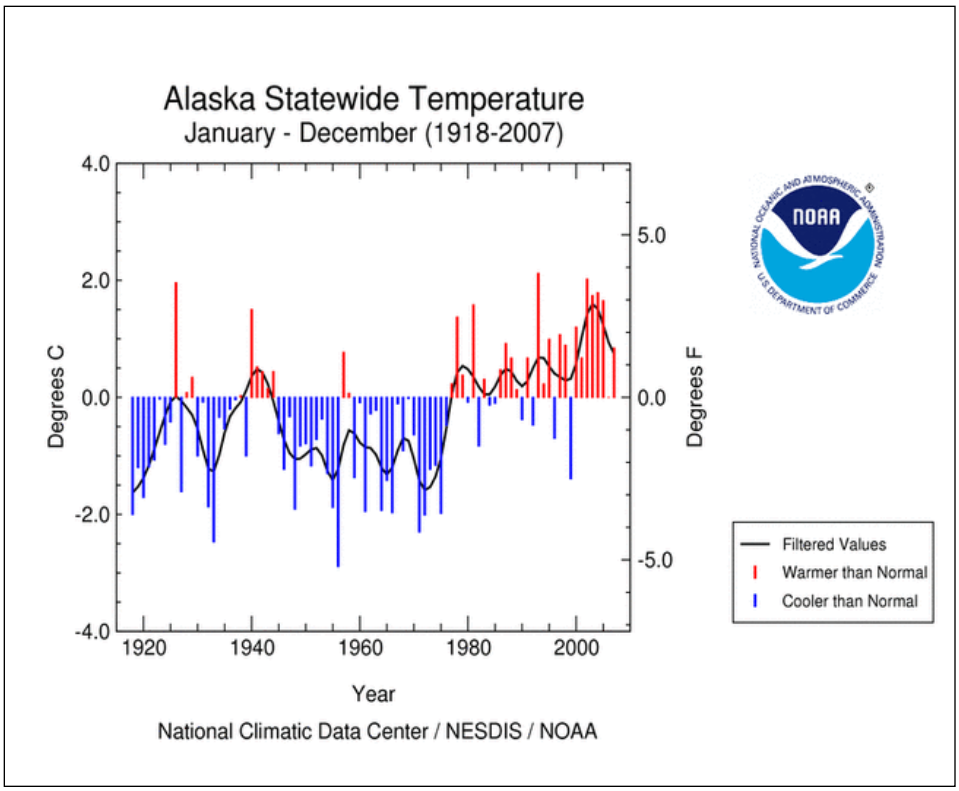



Figure 4. Average temperatures across Alaska ranked 15th warmest on record (1918-2007) above the 1971-2000 mean (NOAA 2008). Figure retrieved from http://www.ncdc.noaa.gov/img/climate/research/2007/ann/alaska_Elemta_01122007_pg.gif

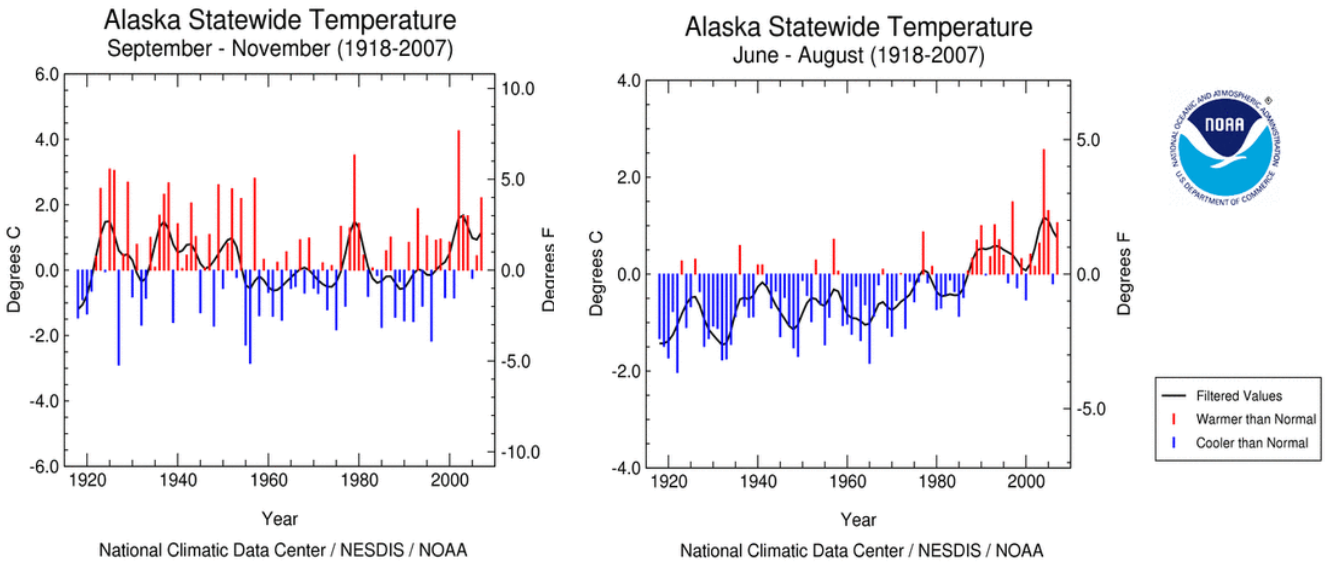



Figure 5. Seasonal statewide temperatures 2007departure from normal (NOAA 2008). Figures retrieved on October 28, 2008 from http://www.ncdc.noaa.gov/img/climate/research/2007/ann/alaska_Elemta_12022007_pg.gif

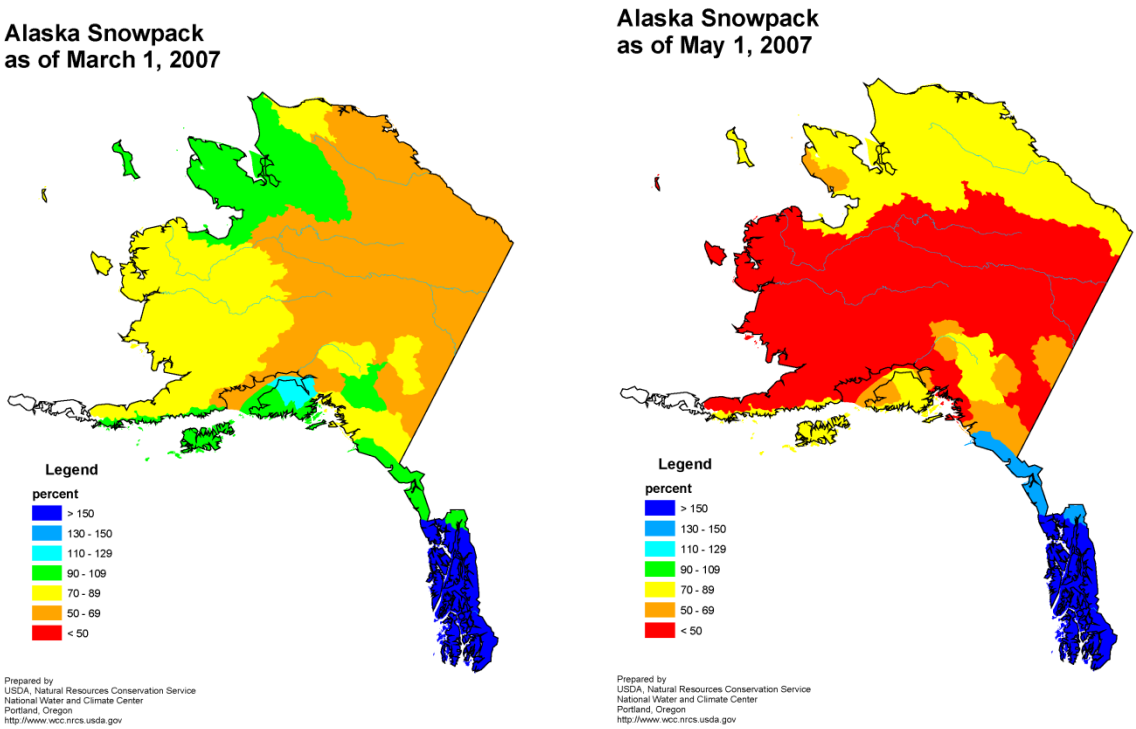



Figure 6. March 1 and May 1 snowpack depths for Alaska 2007 (NRCS 2007). Figures retrieved on October 28, 2008 from http://www.wcc.nrcs.usda.gov/cgibin/ak_snow.pl?state=alaska.

## Temperature

Data records for temperature have been collected at seven locations around the CAKN since 1949. The mean annual temperatures around the CAKN region in 2007 averaged 1.5 °F above normal for all sites except for Yakutat (Figure 7). Most sites had warmer than normal summers and extremely variable winter temperatures (Table 3). November temperatures were between 7 and 16 degrees warmer than normal, while March temperatures were 11 to 13 degrees colder than normal - except for Yakutat (Figure 8). March 2007 was the coldest on record at Denali, Gulkana, Eagle, and McCarthy, which are the longest running stations in CAKN. See Appendix A for 'period of record' data for the long term sites and Appendix B for individual site records.

The mean date of the last spring freeze is usually between June 1 and June 10 for the lower elevations and valleys and between June 11 and June 20 for the higher elevations. In McKinley Park, temperatures were mostly above 32°F starting around May 23, but the last freeze was on June 8. The first fall freeze occurred on September 3, but did after that evening temperatures stayed above freezing until after September 18.

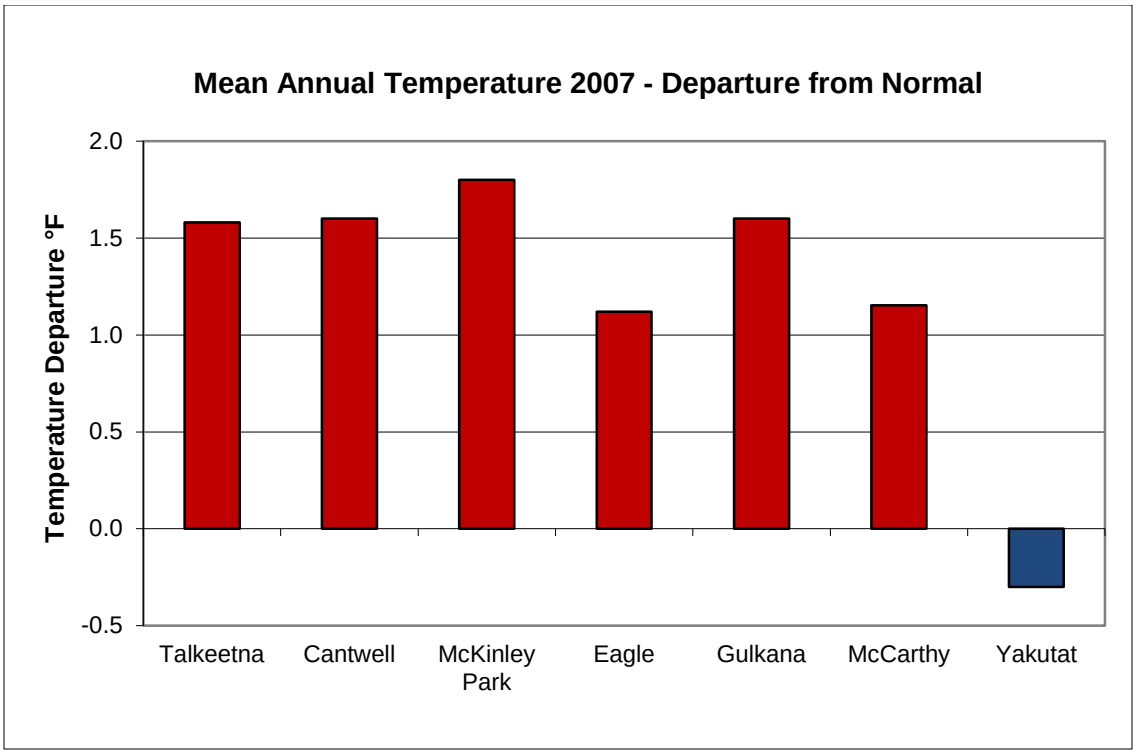



Figure 7. Mean annual temperature departure from normal for 2007 at long-term CAKN sites.

Table 3. 2007 departure from normal (1971-2000) for long-term sites in CAKN.

| *Site* | *Jan* | *Feb* | *Mar* | *Apr* | *May* | *Jun* | *Jul* | *Aug* | *Sep* | *Oct* | *Nov* | *Dec* | *Annual* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Talkeetna | 1.4 | -1.9 | -11.3 | 4.5 | 2.4 | 2.3 | -0.4 | 2.6 | 2.5 | 1.9 | 11.4 | 3.3 | 1.6 |
| Cantwell | 4.4 | -2.7 | -14.8 | 5.8 | 2.8 | 2.0 | 0.7 | 2.7 | 1.8 | 0.4 | 11.2 | 4.1 | 1.6 |
| McKinley Park | 1.6 | 0.7 | -18.6 | 7.2 | 2.7 | 2.9 | 2.0 | 3.9 | 3.4 | -0.4 | 13.3 | 2.6 | 1.8 |
| Eagle | 8.3 | -9.7 | -18.1 | 6.0 | 1.9 | 4.3 | 3.3 | 1.6 | -0.5 | -2.9 | 16.3 | 3.5 | 1.1 |
| Gulkana | 9.1 | -2.8 | -15.3 | 2.3 | 1.0 | 3.7 | 1.3 | 2.3 | 1.5 | 1.3 | 12.3 | 2.3 | 1.6 |
| McCarthy | 9.9 | -4.4 | -13.6 | 1.2 | 1.0 | 4.0 | 2.2 | 2.0 | 1.3 | 2.0 | 7.0 | 1.7 | 1.2 |
| Yakutat | 3.0 | -4.0 | -5.7 | -1.1 | -0.2 | 1.0 | 1.1 | 1.0 | 0.6 | -1.0 | 2.9 | -0.7 | -0.3 |

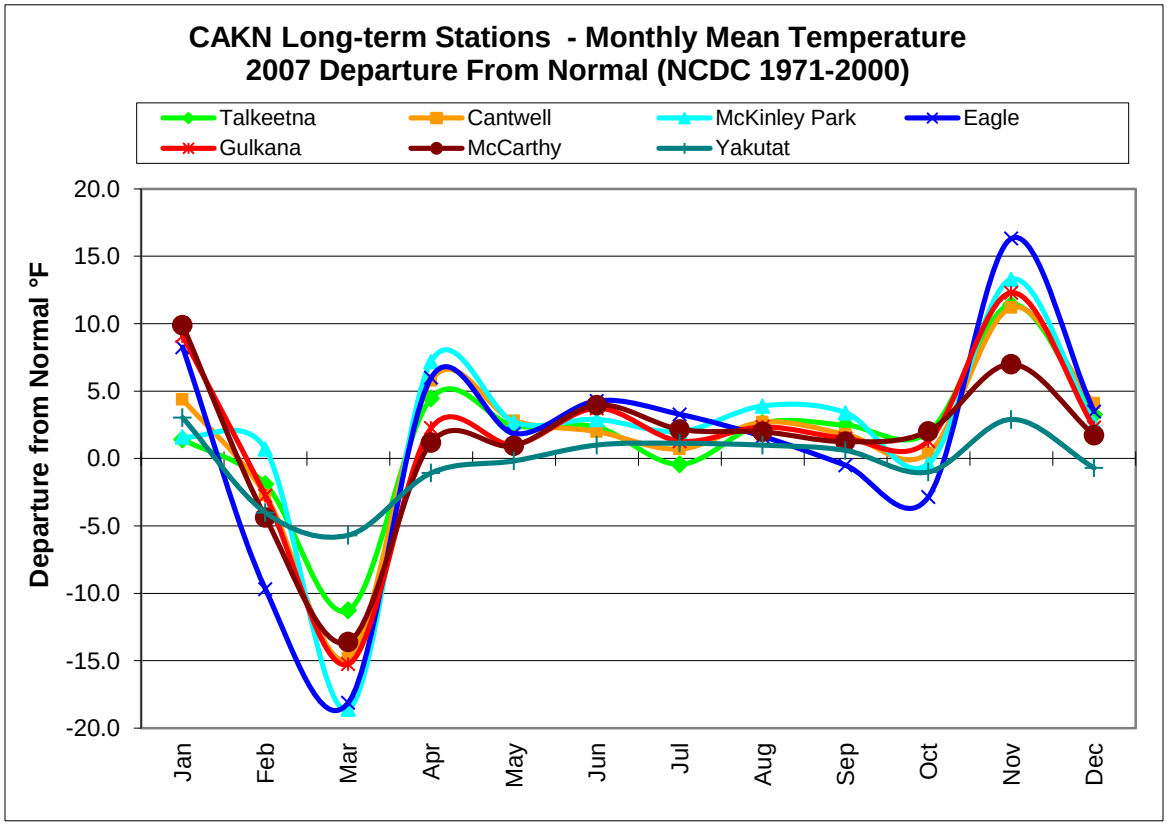



Figure 8. Mean monthly temperatures departure from normal at long-term sites for 2007.

January temperatures in the eastern interior locations of CAKN, including McCarthy, Gulkana, and Eagle were on average 9 degrees F warmer than normal, and at the western interior sites only 1.5 to 4.5 degrees F warmer than normal. Yakutat was also 3 degrees F warmer than normal. In February, temperatures across the region cooled off and all sites were below normal except for McKinley Park. As stated above, March was unusually cold for all of the interior sites and for the coastal site of Yakutat as well. Temperatures rebounded in April with record breaking temperatures the last few days of the month for many interior sites. Warm temperatures and a lack of April snowfall made for a quick and relatively dry spring break-up for central Alaska.

The summer of 2007 was long and warm, but not hot. June and July were warm and dry, followed by a very warm and wet August; some of the highest temperatures of the year were in August, which is unusual. Warm temperatures persisted through September where minimum temperatures in early September were approaching normal high temperatures. In Eagle, the mean temperature for July was 64.1° F or 3.3 degrees F warmer than normal - the warmest July on record, warmer than both 2004 and 2005.

October temperatures were cool farther north in Eagle and Fairbanks, but were near normal to slightly above for more southern interior sites. Temperatures in November were above normal at most sites. Temperatures tend to decrease through the month of November as the interior loses

daylight; this was not the case in 2007. There was a significant warm-up around Thanksgiving as temperatures rose to the mid 40s with a Chinook wind event. In mid December, there was only one brief cold spell lasting just a few days where temperatures were down below -40°F for the first time of the 2007-08 winter season.

The average annual temperatures for all of the CAKN long-term sites are listed in Table 4. These seven sites have long enough records to compare with the latest climate normal period which are listed below the 2007 temperatures in the table. Eagle, the farthest north and the farthest inland from the coast has the coldest annual temperature and Yakutat being on the coast is the warmest. Along the eastern region of the CAKN the temperatures drop off more quickly than those in the western region from south to north, for example Gulkana and Cantwell have similar average annual temperatures and Gulkana is one degree in latitude farther south and at a lower elevation. Figure 9 shows the monthly mean temperatures of the long-term sites with three of the newer high elevation sites from each of the CAKN parks for comparison.

Table 4. Mean monthly and annual temperatures for 2007 from long-term sites

| # of years | Site | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | ANN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 57 | Talkeetna | | | | | | | | | | | | | |
| | 2007 | 12.42 | 13.5 | 11.3 | 38.8 | 48.2 | 57.6 | 58.5 | 58.2 | 48.7 | 33.3 | 28.9 | 16. | 35.5 |
| | *1971-2000 normal* | *11.0* | *15.4* | *22.6* | *34.3* | *45.8* | *55.3* | *58.9* | *55.6* | *46.2* | *31.4* | *17.5* | *13.0* | *33.9* |
| 24 | Cantwell | | | | | | | | | | | | | |
| | 2007 | 4.2 | 1.5 | -2.2 | 31.8 | 42.8 | 52.6 | 55.4 | 52.8 | 42 | 23.1 | 19 | 6.7 | 27.5 |
| | *1971-2000 normal* | *-0.2* | *4.2* | *12.6* | *26.0* | *40.0* | *50.6* | *54.7* | *50.1* | *40.2* | *22.7* | *7.8* | *2.6* | *25.9* |
| 83 | McKinley Park | | | | | | | | | | | | | |
| | 2007 | 3.9 | 5.2 | -5.5 | 34.4 | 44.7 | 55.1 | 57.6 | 54.8 | 43.9 | 22.1 | 22.4 | 7.5 | *28.8* |
| | *1971-2000 normal* | *2.3* | *4.5* | *13.1* | *27.2* | *42.0* | *52.2* | *55.6* | *50.9* | *40.5* | *22.5* | *9.1* | *4.9* | *27.0* |
| 52 | Eagle | | | | | | | | | | | | | |
| | 2007 | -3.34 | -15.8 | -10.3 | 34.8 | 47.9 | 61.8 | 64.1 | 56.4 | 42.3 | 20.5 | 18.5 | -3.3 | 26.1 |
| | *1971-2000 normal* | *-11.6* | *-6.1* | *7.8* | *28.8* | *46.0* | *57.5* | *60.8* | *54.8* | *42.8* | *23.3* | *2.2* | *-6.8* | *25.0* |
| 57 | Gulkana | | | | | | | | | | | | | |
| | 2007 | 4.4 | 0.5 | 0.1 | 33.4 | 44.9 | 56.8 | 58.3 | 55.4 | 44.6 | 27.7 | 17.8 | 0.7 | 28.7 |
| | *1971-2000 normal* | *-4.7* | *3.2* | *15.3* | *31.1* | *43.9* | *53.1* | *57.0* | *53.1* | *43.1* | *26.4* | *5.5* | *-1.6* | *27.1* |
| 22 | McCarthy | | | | | | | | | | | | | |
| | 2007 | 7.5 | 1.6 | 4.4 | 34.4 | 45.0 | 56.0 | 58.1 | 54.2 | 44.6 | 30.3 | 14.2 | 3.3 | 29.5 |
| | *1971-2000 normal* | *-2.4* | *6.0* | *18.0* | *33.2* | *44.0* | *52.0* | *55.9* | *52.2* | *43.3* | *28.3* | *7.2* | *1.6* | *28.3* |
| 59 | Yakutat | | | | | | | | | | | | | |
| | 2007 | 28.8 | 24.4 | 25.8 | 36.1 | 43.4 | 50.7 | 54.7 | 54.3 | 48.8 | 40.1 | 35.3 | 27.9 | 39.2 |
| | *1971-2000 normal* | *25.8* | *28.4* | *31.5* | *37.2* | *43.6* | *49.7* | *53.6* | *53.3* | *48.2* | *41.1* | *32.4* | *28.6* | *39.5* |

Yellow – YUCH, Green – DENA, Blue – WRST

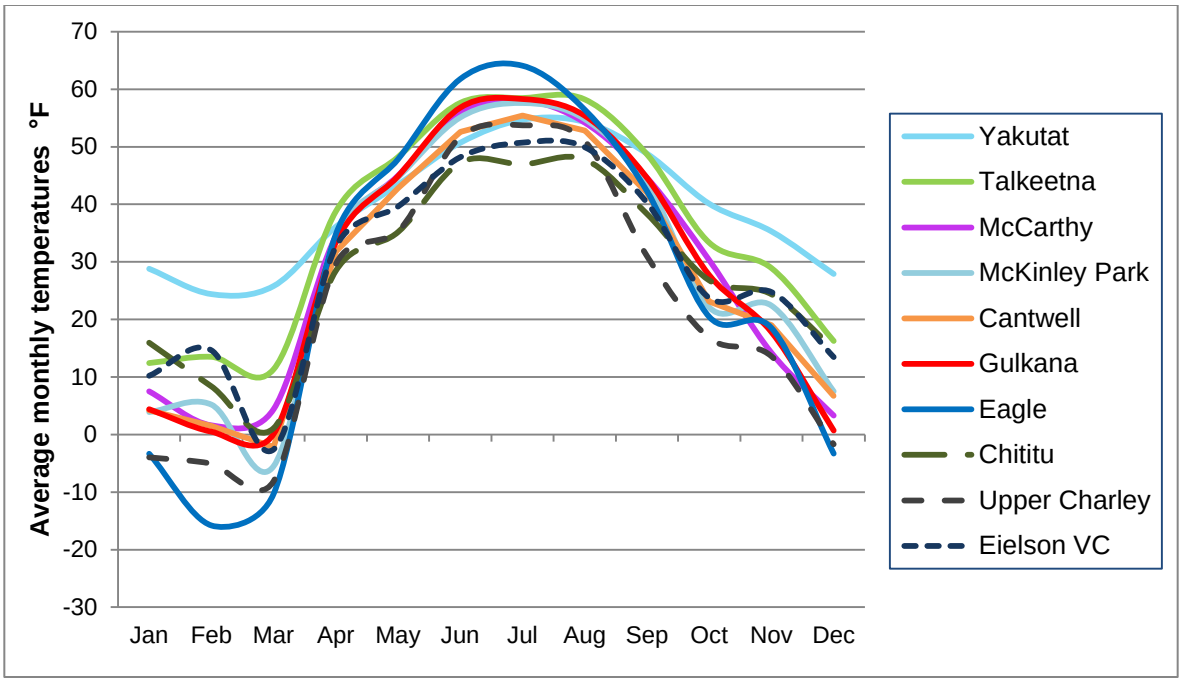



Figure 9. CAKN mean monthly temperatures for 2007.

Table 5. Monthly mean temperatures from CAKN stations 2007.

| Site | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Stampede | -2.5 | -3.8 | -8.8 | 34.2 | 44.7 | 53.6 | 56.2 | 52.7 | 41.2 | 17.4 | 14.2 | -0.4 | **24.9** |
| Toklat | 7.1 | 5.2 | -8.4 | 32.5 | 41.5 | 50.8 | 52.8 | 50.7 | 40.9 | 20.1 | 22.3 | 10.1 | **27.1** |
| Eielson VC | 10.2 | 14.6 | -2.6 | 32.6 | 39.6 | 48.2 | 50.7 | 49.9 | 40.3 | 23.7 | 24.8 | 13.5 | **28.8** |
| Wonder Lake | 2.0 | 1.0 | -5.8 | 33.8 | 44.4 | 53.6 | 56.1 | 53.1 | 42.0 | 17.8 | 16.3 | 4.2 | **26.5** |
| Dunkle Hills | 8.9 | 6.2 | -1.7 | 29.6 | 39.9 | 49.9 | 51.2 | 49.9 | 39.7 | 23.4 | 21.6 | 10.3 | **27.4** |
| Coal Creek | -3.0 | -16.8 | -9.0 | 35.1 | 48.7 | 60.4 | 62.1 | 55.1 | 41.4 | 17.8 | 11.0 | -6.6 | **24.7** |
| Upper Charley | -4.0 | -5.1 | -8.1 | 29.6 | 35.3 | 51.7 | 53.7 | 51.0 | 31.0 | 16.8 | 13.6 | -1.7 | **22.0** |
| Chicken Creek | 11.4 | 2.7 | -4.3 | 26.1 | 35.7 | 46.7 | 47.6 | 47.6 | 36.0 | 21.1 | 20.4 | 8.8 | **25.0** |
| Chisana | -4.6 | -6.2 | -7.3 | 29.2 | 42.6 | 54.1 | 55.1 | 51.4 | 38.9 | 17.6 | 7.0 | -7.8 | **22.5** |
| Chititu | 16.0 | 8.4 | 1.1 | 28.5 | 35.2 | 47.2 | 47.0 | 47.8 | 38.3 | 26.8 | 24.4 | 14.9 | **28.0** |
| May Creek | 6.2 | -0.5 | 3.9 | 34.7 | 45.2 | 57.4 | 58.0 | 54.1 | 43.0 | 27.5 | 14.7 | 2.5 | **28.9** |
| Gates Glacier | 17.3 | 8.0 | 4.0 | 29.4 | 36.6 | 48.5 | 48.2 | 48.7 | 38.5 | 26.4 | 25.2 | 18.6 | **29.1** |
| Klawasi | 4.4 | 0.5 | 0.1 | 33.4 | 44.9 | 56.8 | 58.3 | 55.4 | 44.6 | 27.7 | 17.8 | 0.7 | **28.7** |
| McCarthy | 13.3 | 4.4 | 0.9 | 33.0 | 41.6 | 53.9 | 54.4 | 53.6 | 42.4 | 27.0 | 24.8 | 10.2 | **30.0** |
| Tebay | 7.5 | 1.6 | 4.4 | 34.4 | 45 | 56 | 58.1 | 54.2 | 44.6 | 30.3 | 14.2 | 3.3 | **29.5** |
| Tana Knob | 13.7 | 8.3 | 6.2 | 30.9 | 40.8 | 50.8 | 52.6 | 51.6 | 43.1 | 30.1 | 22.5 | 10.9 | **30.1** |

Yellow – YUCH, Green – DENA, Blue – WRST

### *New CAKN Sites*

Although the new CAKN climate stations and other Remote Automated Weather Stations (RAWS) around the CAKN parks do not have long records, the monthly and annual averages and totals fill in some of the large spatial gaps in the network and offer information on the differences in climate at higher elevations. Table 5 lists the monthly and annual temperatures for these sites grouped by park and Figure 9 shows them graphically. The monthly average temperatures are warmer for the lower elevation interior sites during the summer months, while the winter monthly average temperatures are warmer at higher elevations, effectively smoothing the annual averages. Figure 10 shows the December average temperature ranging from approximately 1° to 19 ° F for 8 sites in WRST with elevations spanning from 1,250 feet to 4,554 feet. See Appendix C for monthly summaries from the CAKN climate sites.

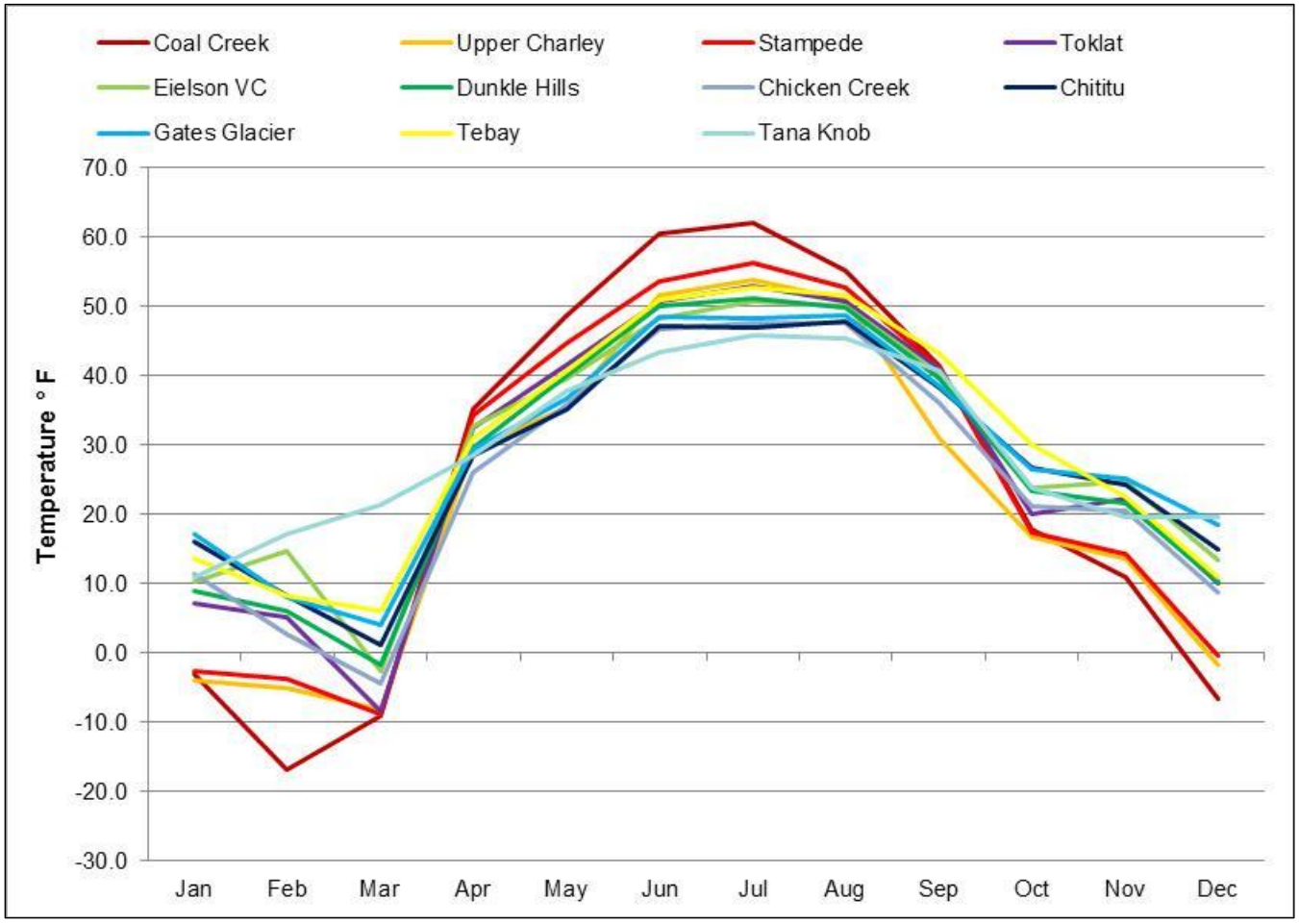



Figure 10.Monthly mean temperatures for the new CAKN climate stations.

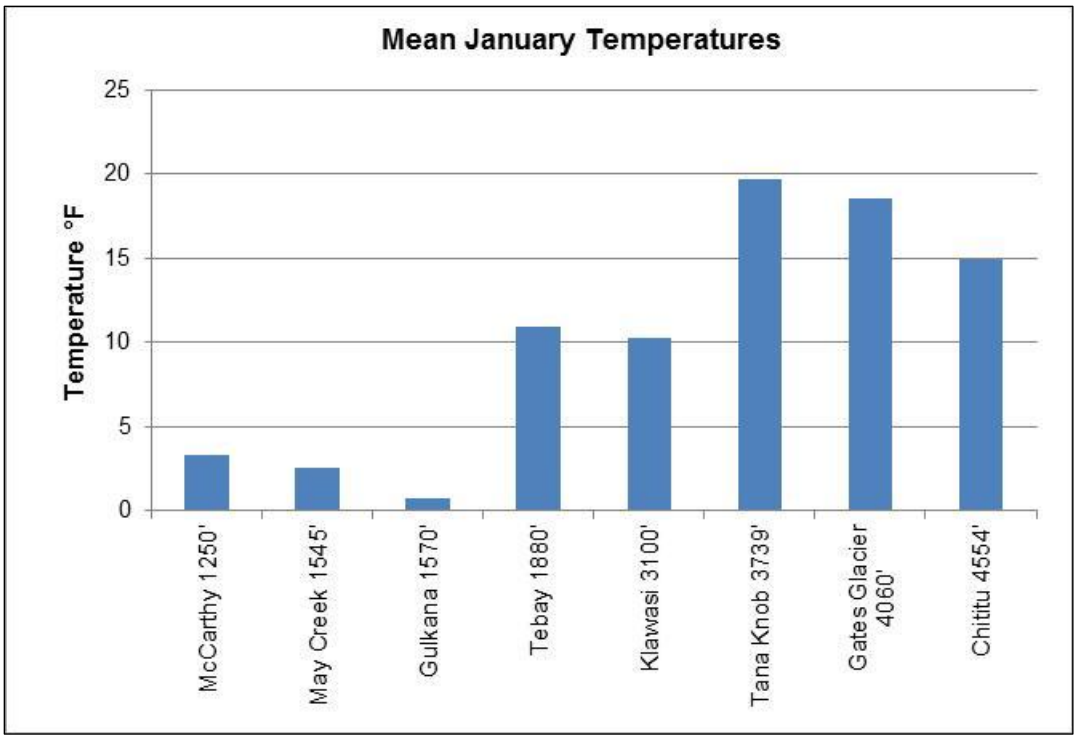



Figure 11.Mean January temperatures at 8 locations in WRST.

Correlations between the paired high and low elevation sites are best described by monthly means rather than annual means. In the summer, the higher sites tend to be 5 to 10° colder depending on the elevation (an increase in elevation lowers the temperature), but in the winter if the air is still and the temperature plummets, the cold air sinks into the valleys and a persistent inversion sets up and the higher elevations can be 10 to 20° F warmer than the surrounding lowlands. The air is often still in the darker winter months due to the lack of solar radiation that generates the surface winds that are so common in the summer. Of course, if a storm system moves in from the Gulf of Alaska or Bering Sea, warm ocean winds (known as Chinook) often funnel through the mountain passes, raising temperatures and stirring up the air. The areas just north of these mountain passes often get winds in excess of 40 mph during these events.

The following tables show the monthly and annual variation between low and high elevation sites in the three CAKN parks. Table 6 shows Chicken Creek and Chisana sites which are both located north of the Wrangell Mountain Range in WRST in the continental interior, north of two major mountain ranges. The annual temperature was 2.5 degrees colder at Chisana, the lower elevation site. January, February, March, October, November and December average temperatures were warmer at Chicken Creek. Table 6 also shows May Creek and Chititu which are both located in the Chitina River Valley between the Wrangell Mountain Range to the north and the Chugach Range to the south. The higher site, in this instance, was 0.9 degrees colder than the lower site, with the average winter monthly temperatures warmer at the higher site.

Table 7 shows the high and low elevation sites in YUCH. Coal Creek, the lower site, was surprisingly warmer than the Upper Charley site in January, but was colder in February, March,

November and December. January of 2006 was also warmer at Upper Charley. The records at Eagle were checked to see if they matched Coal Creek, and January temperatures at Coal Creek and Eagle were within 0.5 degrees of one another. The warmest high elevation site for 2007 was Eielson Visitor Center in Denali (Table 7). This site and Chicken Creek in WRST had warmer monthly average temperatures compared with the paired low elevation site for January, February, March, October, November, and December, or 6 out of 12 months.

Table 6. Mean monthly temperatures at high and low elevation paired sites in WRST.

| *Month* | *Chicken Creek* | *Chisana* | *Chititu* | *May Creek* |
|---|---|---|---|---|
| | **Elev. - 5260'** | **Elev. - 3320** | **Elev. - 4554'** | **Elev. - 1650'** |
| Jan | 11.4 | -4.6 | 16 | 6.2 |
| Feb | 2.7 | -6.2 | 8.4 | -0.5 |
| Mar | -4.3 | -7.3 | 1.1 | 3.9 |
| Apr | 26.1 | 29.2 | 28.5 | 34.7 |
| May | 35.7 | 42.6 | 35.2 | 45.2 |
| Jun | 46.7 | 54.1 | 47.2 | 57.4 |
| Jul | 47.6 | 55.1 | 47 | 58 |
| Aug | 47.6 | 51.4 | 47.8 | 54.1 |
| Sep | 36 | 38.9 | 38.3 | 43 |
| Oct | 21.1 | 17.6 | 26.8 | 27.5 |
| Nov | 20.4 | 7 | 24.4 | 14.7 |
| Dec | 8.8 | -7.8 | 14.9 | 2.5 |
| **Annual** | **25** | **22.5** | **28** | **28.9** |

Table 7. Mean monthly temperatures at paired high and low elevations in YUCH and DENA.

| | *YUCH* | | *Denali* | |
|---|---|---|---|---|
| **Month** | **Upper Charley** | **Coal Creek** | **Eielson VC** | **Stampede** |
| | Elev. - 3654' | Elev. - 802' | Elev. - 3730' | Elev. - 1800' |
| Jan | -4 | -3 | 10.2 | -2.5 |
| Feb | -5.1 | -16.8 | 14.6 | -3.8 |
| Mar | -8.1 | -9 | -2.6 | -8.8 |
| Apr | 29.6 | 35.1 | 32.6 | 34.2 |
| May | 35.3 | 48.7 | 39.6 | 44.7 |
| Jun | 51.7 | 60.4 | 48.2 | 53.6 |
| Jul | 53.7 | 62.1 | 50.7 | 56.2 |
| Aug | 51 | 55.1 | 49.9 | 52.7 |
| Sep | 31 | 41.4 | 40.3 | 41.2 |
| Oct | 16.8 | 17.8 | 23.7 | 17.4 |
| Nov | 13.6 | 11 | 24.8 | 14.2 |
| Dec | -1.7 | -6.6 | 13.5 | -0.4 |
| **Annual** | **22** | **24.7** | **28.8** | **24.9** |

Red indicates warmer temperatures and blue indicates colder temperatures.

## Precipitation

Annual precipitation totals throughout the network were below normal for most of the sites except for McCarthy and Eagle which were close to normal (Figure 12). It was a relatively dry year, yet the wildfire season was quiet. Convective storms were frequent throughout the interior with isolated rainfall that may not get picked up by the sparse network of long-term precipitation sites in the state. The total precipitation for Talkeetna was more than 6 inches less than normal and Gulkana was more than 3 inches less than normal (Table 8). The precipitation amounts for Yakutat are generally five times greater on average than the other sites in the network, because of this difference, Yakutat totals are on a separate graph (Figure 13).

McCarthy and Cantwell experienced a wet May with precipitation totals 200-400% of normal; it was the wettest May on record at McCarthy followed by the driest June on record. June and July were relatively dry with isolated rain showers throughout the interior. Cantwell, Talkeetna, Gulkana, and McCarthy precipitation totals were well above normal for August and September, with Eagle recording the wettest August on record (Figure 14). Yakutat had the driest summer on record with a total of 8.46 inches for June, July, and August – the normal is 26.19 inches. See Appendix B for records for all long-term sites.

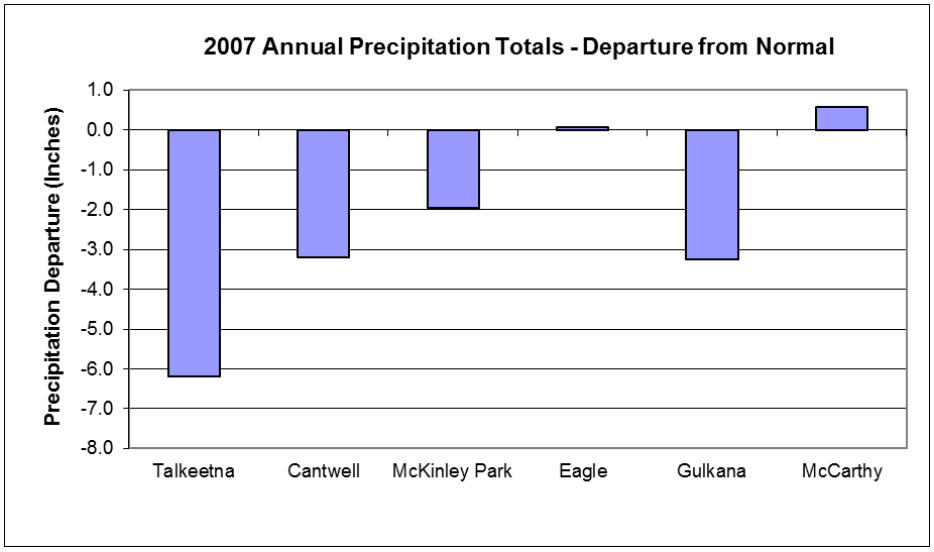



Figure 12. Annual precipitation totals - departure from normal 2007.

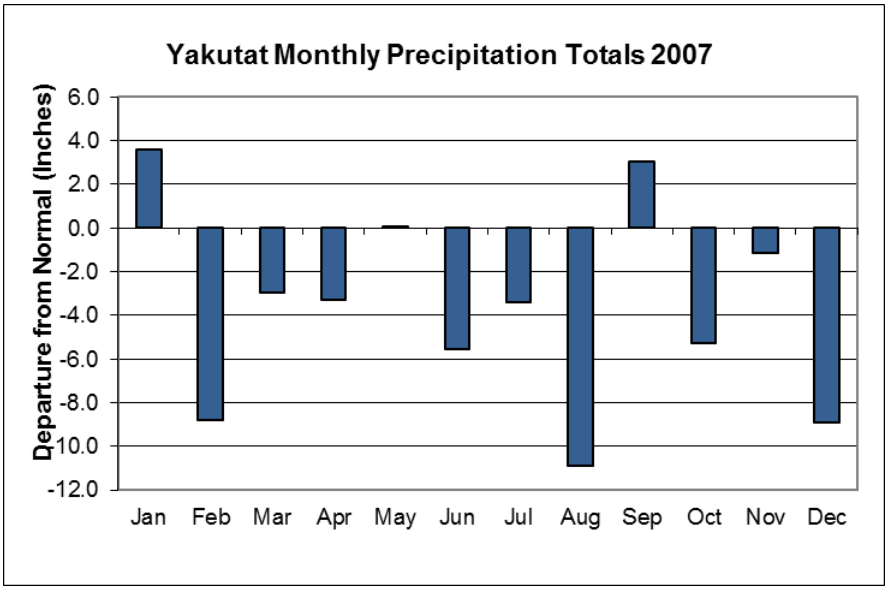



Figure 13. Yakutat monthly precipitation totals.

Table 8. Total monthly precipitation at long-term CAKN sites for 2007 compared with 1971-2000 normals

| # of years | Site | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | ANN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **28** | **Talkeetna** | | | | | | | | | | | | | |
| | 2007 | 1.50 | 0.01 | 0.33 | 0.02 | 0.55 | 1.13 | 3.73 | 3.77 | 6.30 | 1.34 | 1.47 | 1.84 | 21.99 |
| | *1971-2000 normal* | *1.45* | *1.28* | *1.26* | *1.22* | *1.64* | *2.41* | *3.24* | *4.53* | *4.35* | *3.06* | *1.78* | *1.96* | *28.18* |
| **24** | **Cantwell** | | | | | | | | | | | | | |
| | 2007 | 0.54 | 0.57 | 0.18 | 0.03 | 1.53 | 1.06 | 1.45 | 2.71 | 2.22 | 1.87 | 0.4 | 0.19 | 12.75 |
| | *1971-2000 normal* | *0.89* | *0.63* | *0.49* | *0.39* | *0.68* | *1.7* | *2.73* | *3.07* | *2.61* | *1.09* | *0.74* | *0.93* | *15.95* |
| **83** | **McKinley Park** | | | | | | | | | | | | | |
| | 2007 | 0.48 | 0.63 | 0.24 | 0.31 | 1.12 | 1.49 | 1.57 | 4.17 | 2.05 | 0.35 | 0.34 | 0.27 | 13.02 |
| | *1971-2000 normal* | *0.7* | *0.54* | *0.38* | *0.27* | *0.67* | *2.22* | *3.09* | *2.62* | *1.76* | *1.05* | *0.78* | *0.89* | *14.97* |
| **52** | **Eagle** | | | | | | | | | | | | | |
| | 2007 | 0.99 | 0 | 0.66 | 0.39 | 0.72 | 0.94 | 0.75 | 4.75 | 1.71 | 0.39 | 0.39 | 0.39 | 12.08 |
| | *1971-2000 normal* | *0.44* | *0.47* | *0.31* | *0.3* | *1.17* | *1.78* | *2.13* | *1.85* | *1.17* | *0.97* | *0.67* | *0.75* | *12.01* |
| **57** | **Gulkana** | | | | | | | | | | | | | |
| | 2007 | 1.01 | 0.02 | 0.61 | 0.07 | 0.63 | 0.52 | 1.35 | 0.59 | 2.05 | 0.26 | 0.39 | 0.64 | 8.14 |
| | *1971-2000 normal* | *0.45* | *0.52* | *0.36* | *0.22* | *0.59* | *1.54* | *1.82* | *1.8* | *1.44* | *1.02* | *0.67* | *0.97* | *11.4* |
| **22** | **McCarthy** | | | | | | | | | | | | | |
| | 2007 | 1.47 | 0.05 | 0.21 | 0.01 | 2.5 | 0.28 | 1.39 | 1.86 | 4.76 | 0.83 | 1.45 | 3.48 | 18.29 |
| | *1971-2000 normal* | *1* | *0.84* | *0.4* | *0.23* | *0.64* | *1.8* | *2.38* | *2.3* | *2.85* | *2.29* | *1.17* | *1.82* | *17.72* |
| **59** | **Yakutat** | | | | | | | | | | | | | |
| | 2007 | 16.76 | 2.19 | 8.43 | 7.50 | 9.87 | 1.60 | 4.46 | 2.40 | 23.90 | 18.74 | 14.02 | 6.95 | 116.82 |
| | *1971-2000 normal* | *13.2* | *11* | *11.4* | *10.8* | *9.78* | *7.17* | *7.88* | *13.3* | *20.9* | *24* | *15.2* | *15.9* | *160.4* |

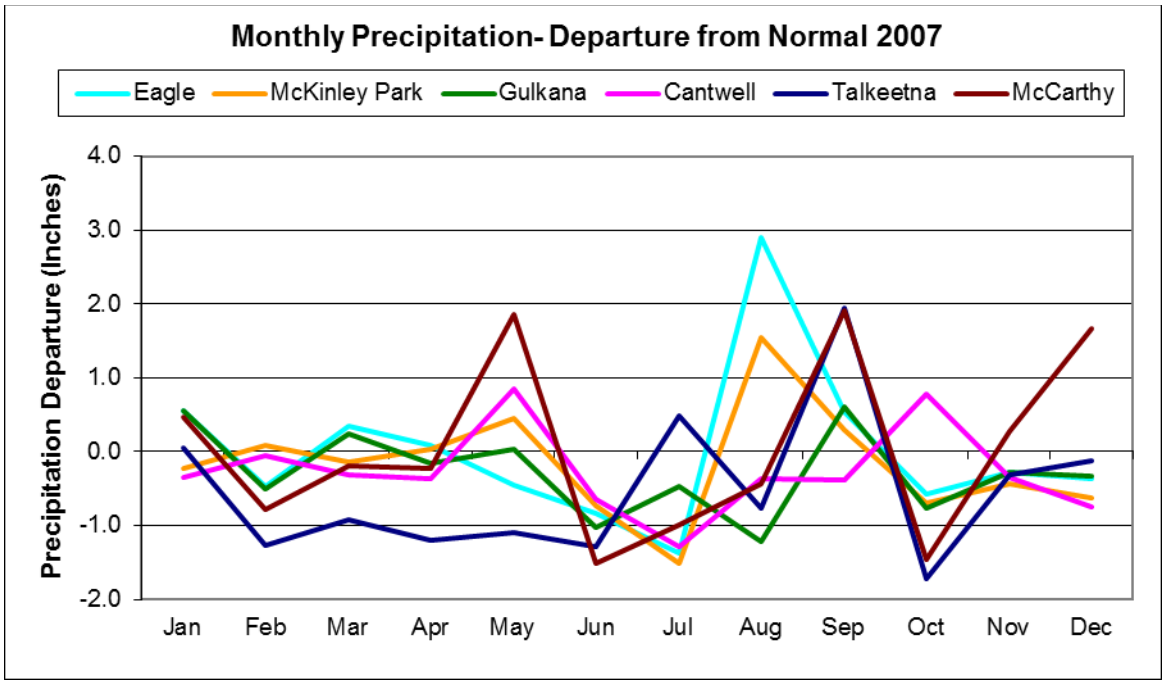
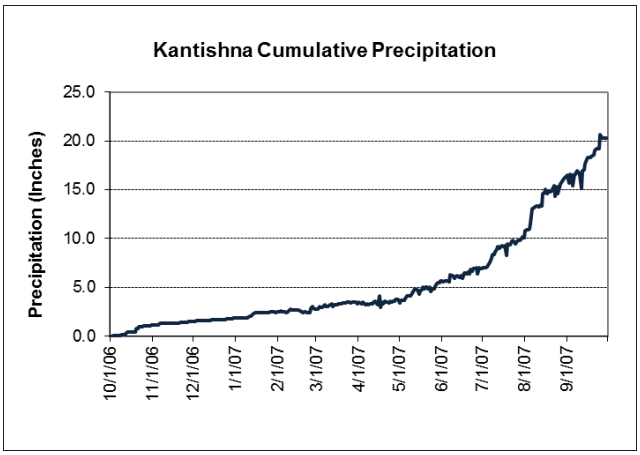
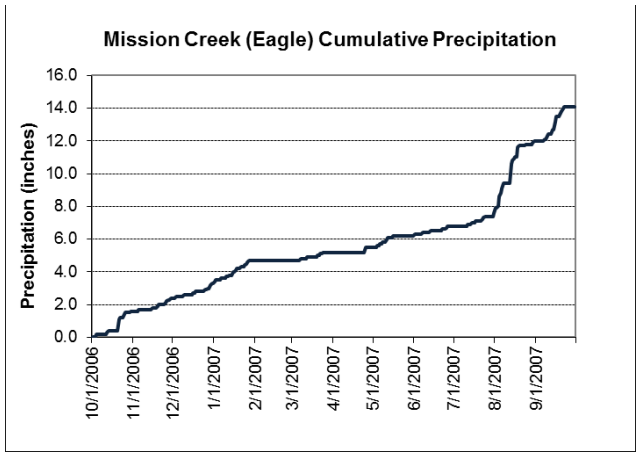


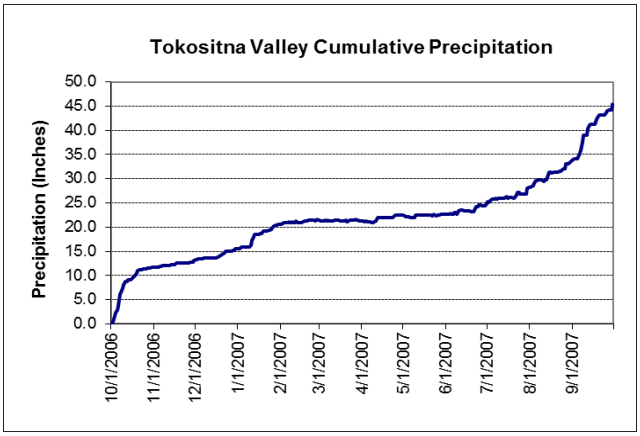

Figure 14. Monthly precipitation totals departure from normal for 2007.

Year round precipitation is recorded at the new snow telemetry (SNOTEL) sites deployed in DENA and WRST as part of the CAKN climate and snow programs. A site at Eagle provides this information for YUCH. These new sites provide an accurate representation of winter snow water equivalent at remote sites. These sites, along with the snow courses and aerial markers, surveyed monthly throughout the winter season, are based on the 'water year' running from October 1 through September 30. An annual report summarizing the snow and precipitation data from snow courses, aerial markers, and SNOTEL sites around the network is produced in the late fall of each year (Sousanes 2009). Two new SNOTEL sites in Denali, one new site in WRST,and an existing site near Eagle are briefly summarized in this report.

The Kantishna SNOTEL site recorded 3.8 inches of total winter precipitation for October 1, 2006 through May 1, 2007, and 16.5 inches from May1 through September 30, for a total annual precipitation amount of 20.3 inches. The Mission Creek SNOTEL, near Eagle, had a total of 6.1 inches of precipitation between October 1, 2006 and May 1, 2007, the average is 5.8 inches, and 8 inches for May through September for an annual total of 14.1 inches; just above the normal of 13.6 inches. At Tokositna Valley, on the south side of Denali, the precipitation gage recorded 22.6 inches of precipitation from October 1, 2006 through May 1, 2007, and 45.4 inches total for the year. Cumulative precipitation graphs for the three SNOTEL sites are presented in Figure 15 (note the differences in scale).



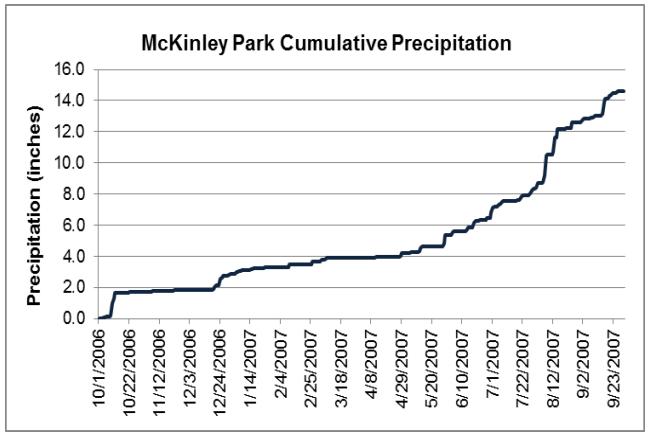




Figure 15. Cumulative precipitation for Water Year 2007 (Oct. 1 – Sep.30) for three SNOTEL sites.

## Discussion

The 2007 field season marked the first year of operational climate monitoring within CAKN. From this point on the monitoring protocols will be updated as necessary to incorporate changes in the operational aspect of the program due to technological advances in equipment, etc. Annual maintenance and sensor calibration will be performed on an annual basis by network staff.

The CAKN climate stations transmit data via satellite and are available on the web at http://www.wrcc.dri.edu/NPS.html. Data products that are available on the web include daily and monthly summaries, time series graphs, wind rose graphs, data inventories, and station metadata for all of the automated stations. The data are downloaded from the stations each year and are QA/QC by network staff and sent to WRCC to fill in any gaps from missed satellite transmissions. The raw data are also available for download through the 'data lister' tool on the WRCC website.

During the 2007 field season maintenance and sensor calibrations were conducted for all of the CAKN climate stations during the FY2007 field season. There were three stations (Upper Charley in YUCH, Tana Knob in WRST, and Wigand Creek in DENA) that were 'disrupted' by bears this season – it is somewhat unusual to have 3 stations in one year impacted by wildlife The equipment was either repaired or replaced and all sites are back on-line.

A third snow telemetry (SNOTEL) site was added to the network at May Creek in Wrangell-St. Elias under a contract with the Natural Resources Conservation Service (NRCS). This site is identical to the other SNOTEL sites and will provide year round precipitation data including a tipping bucket for summer rainfall, an all-weather gage for mixed precipitation and snowfall, and a snow depth sensor. The data from this station are transmitted hourly via meteor burst communication and are online at http://www.ambcs.org/SiteViewer.shtml. In addition to these measurements the site also measures and records air temperature and solar radiation. This is the third of five SNOTEL sites planned for the network.

The report summarized the climate for the CAKN region with brief references to the Alaska region climate and the global climate. For a graphic display of worldwide significant climate anomalies for 2007 see Appendix D.

## Literature Cited


Arctic Climate Impact Assessment (ACIA). 2005. Cambridge University Press. Report retrieved on October 28, 2008 from http://www.acia.uaf.edu.

Chapin, F. S., et al. 2005. Role of Land-Surface Changes in Arctic Summer Warming. Science 310: 657-660.

Hartmann, B., and G. Wendler. 2005. The significance of the 1976 pacific shift in the climatology of Alaska. J. Climate, 18, 4824-4839.

Joint Institute for the Study of the Atmosphere and Ocean (JISAO). 2008. Pacific Decadal Oscillation web page. University of Washington, Climate impacts group. Retrieved on October 23, 2008 from http://cses.washington.edu/cig/pnwc/aboutpdo.shtml

National Oceanic and Atmospheric Administration. 2008. Climate of 2007 – in historical perspective. Annual Report. National Climatic Data Center. Ashland, N.C. Retrieved on October 22, 2008 from http://www.ncdc.noaa.gov/img/climate/research/2007/ann

Natural Resources Conservation Service. 2008. Alaska Snow Survey Report. March 1, 2007 and May 1, 2007. Online. (http://www.ambcs.org/). Accessed 15 September 2008.

National Snow and Ice Data Center (NSIDC) 2008. Arctic Sea Ice News and Analysis website. Information retrieved on November 6, 2008 from http://nsidc.org/arcticseaicenews/

Papineau, J., 2003. Understanding Alaska's Climate Variation. Retrieved on November 1, 2009 from http://pafc.arh.noaa.gov/climvar/climate-paper.html.

Sousanes, P. J. 2004. Climate monitoring protocol for the Central Alaska Network – Denali National Park and Preserve, Yukon-Charley River National Preserve, and Wrangell -St. Elias National Park and Preserve. National Park Service, Denali Park, Alaska.

Sousanes, P. J. 2008. Snowpack monitoring: 2006-2007 season. Central Alaska Network. Natural Resource Technical Report NPS/CAKN/NRTR—2008/140. National Park Service, Fort Collins, Colorado.

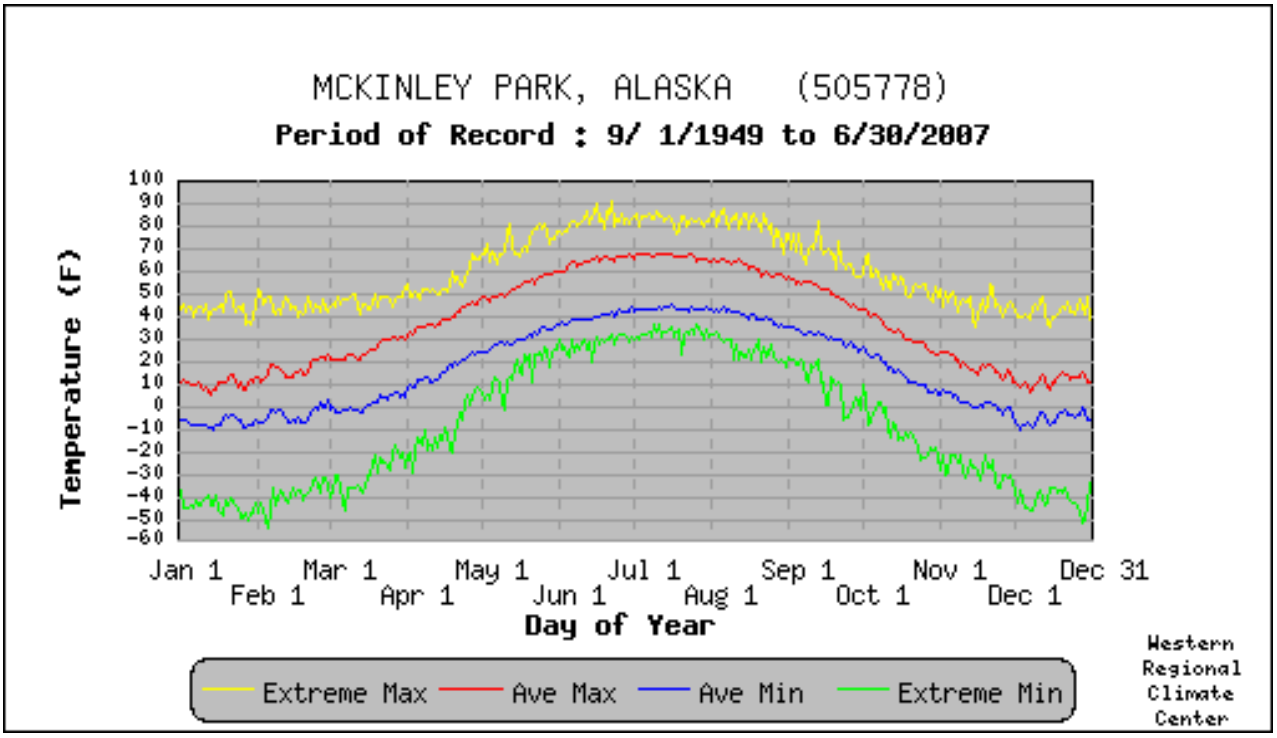
Western Regional Climate Center (WRCC). 2008. Historical climate information. Information retrieved on October 23, 2008 from http://www.wrcc.dri.edu/summary/Climsmak.html.

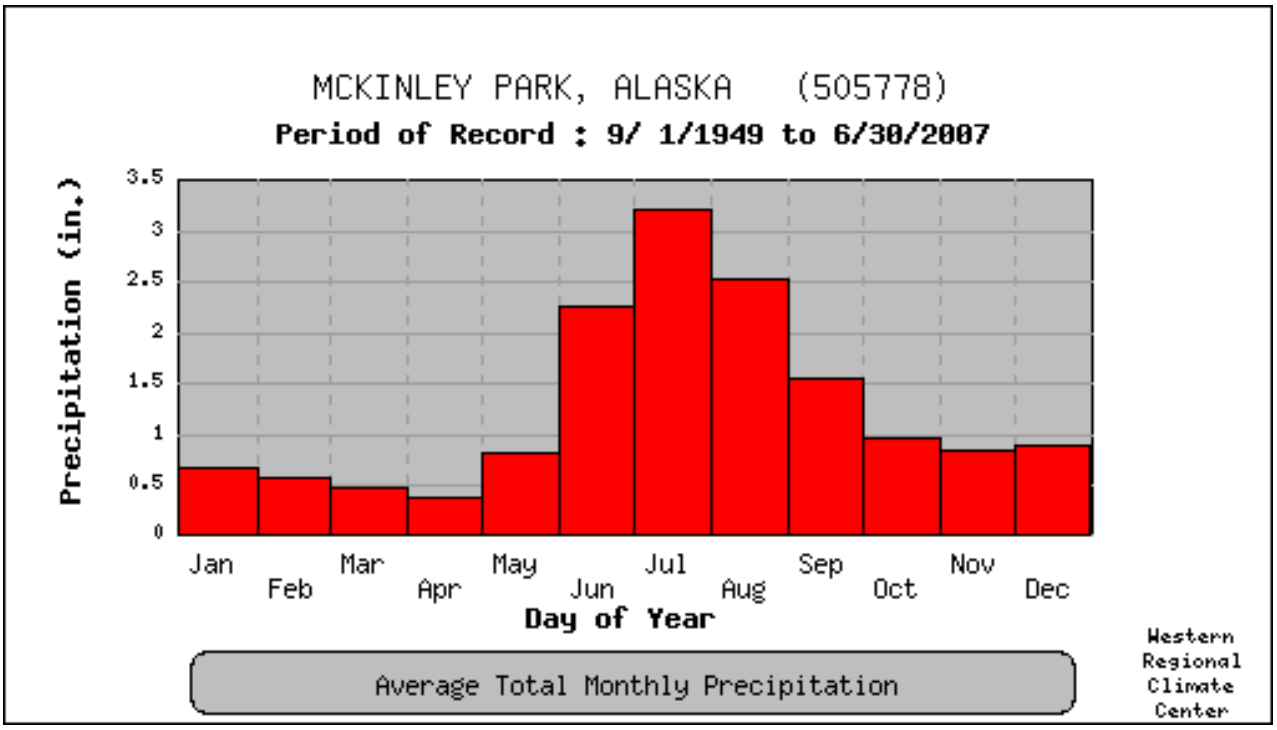
## Appendix A: Period of Record Means for Long-term Sites in CAKN

Data retrieved for this section on June 30, 2007 from the Western Regional Climate Center website at http://www.wrcc.dri.edu/summary/Climsmak.html

**McKinley Park Period of Record Monthly Climate Summary**
Period of Record: 9/ 1/1949 to 6/30/2007

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average Max. Temperature (F) | 9.6 | 16.1 | 25.0 | 38.7 | 53.5 | 64.3 | 66.4 | 61.4 | 50.5 | 32.3 | 17.6 | 11.2 | 37.2 |
| Average Min. Temperature (F) | -7.5 | -4.3 | 0.8 | 15.7 | 29.8 | 39.6 | 43.3 | 39.9 | 30.5 | 14.4 | 1.1 | -5.7 | 16.5 |
| Average Total Precipitation (in.) | 0.68 | 0.58 | 0.47 | 0.37 | 0.83 | 2.29 | 3.24 | 2.54 | 1.58 | 0.97 | 0.84 | 0.91 | 15.29 |
| Average Total Snow Fall (in.) | 10.5 | 9.8 | 7.8 | 5.1 | 3.1 | 0.3 | 0.0 | 0.0 | 4.4 | 12.8 | 13.3 | 13.6 | 80.7 |
| Average Snow Depth (in.) | 17 | 20 | 21 | 17 | 2 | 0 | 0 | 0 | 1 | 3 | 8 | 13 | 8 |

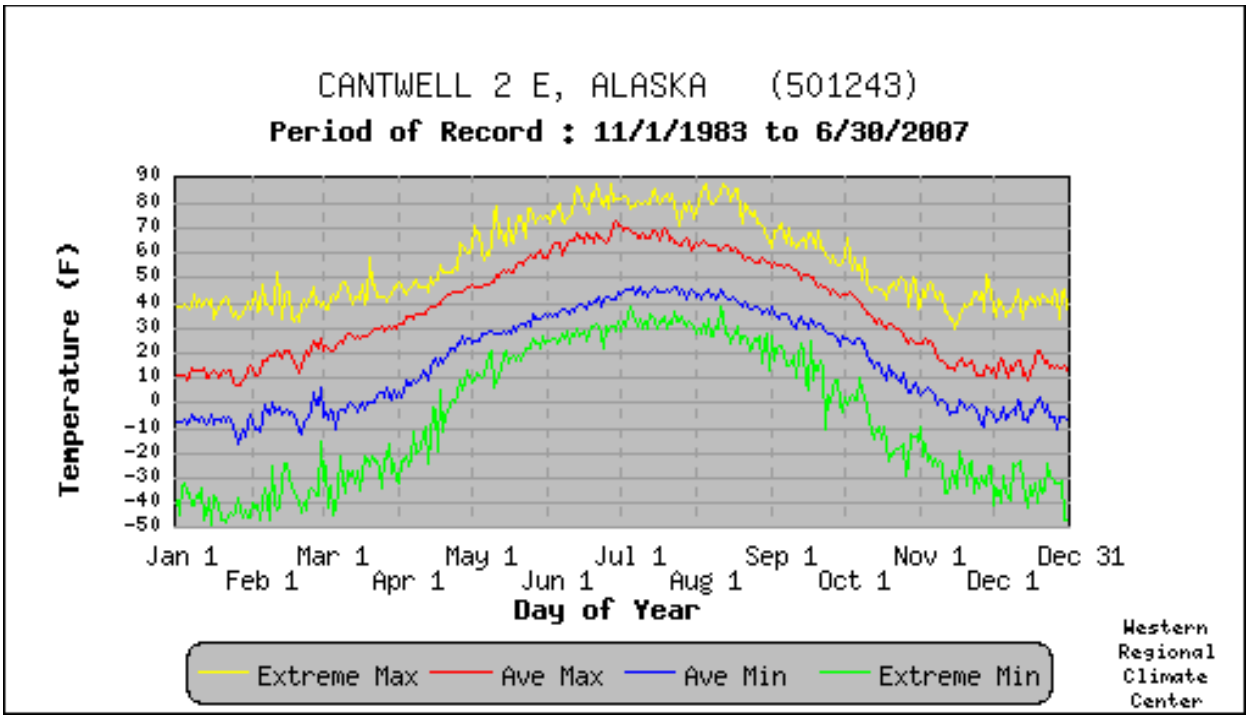


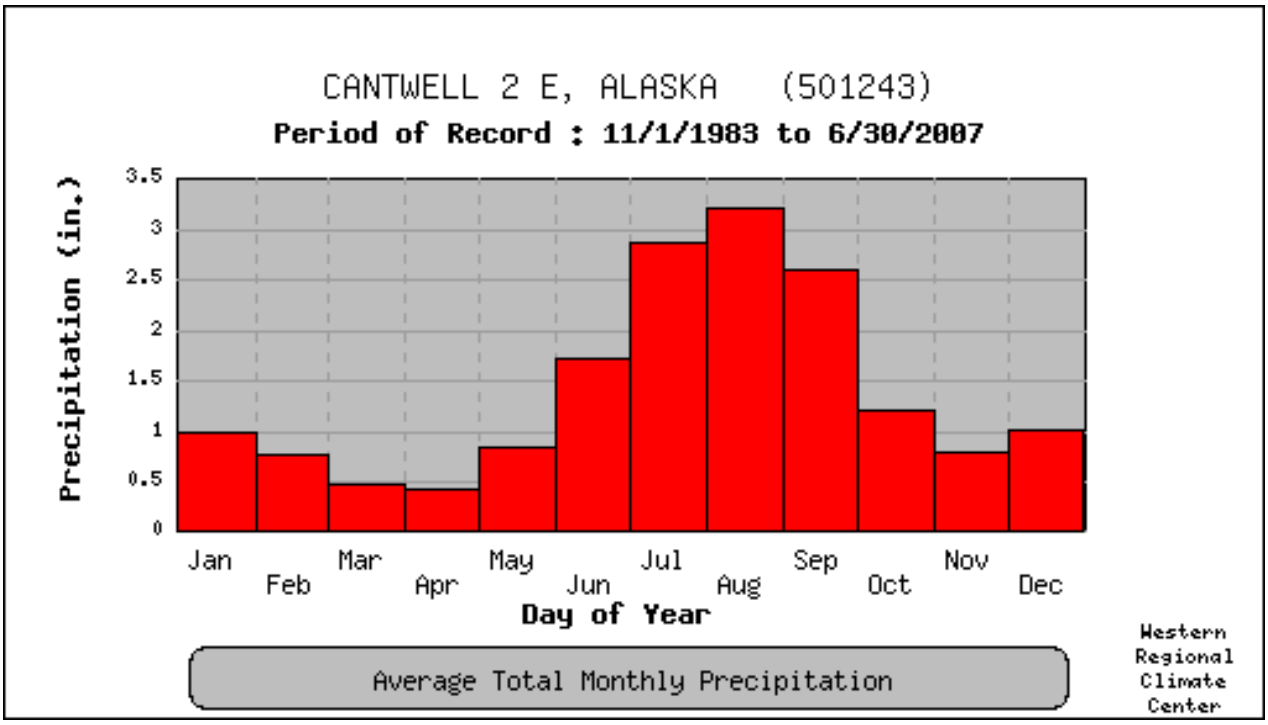



**Cantwell Period of Record Monthly Climate Summary**

Period of Record: 11/1/1983 to 6/30/2007

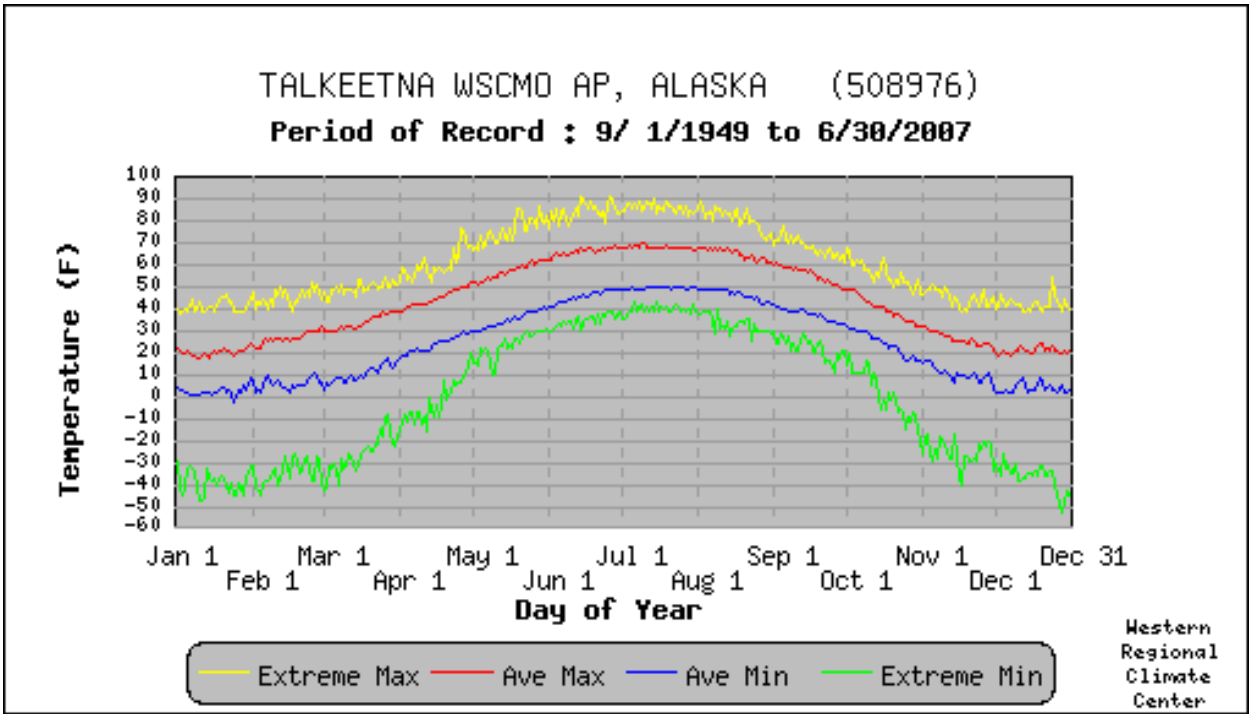
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average Max. Temperature (F) | 11.2 | 17.6 | 25.8 | 38.7 | 52.7 | 65.0 | 66.2 | 60.4 | 49.7 | 32.4 | 16.3 | 14.7 | 37.5 |
| Average Min. Temperature (F) | -8.5 | -5.3 | -1.0 | 14.7 | 28.8 | 38.2 | 44.3 | 40.3 | 30.7 | 14.7 | -1.3 | -4.7 | 15.9 |
| Average Total Precipitation (in.) | 0.98 | 0.76 | 0.46 | 0.42 | 0.84 | 1.74 | 2.88 | 3.23 | 2.63 | 1.18 | 0.81 | 1.02 | 16.95 |
| Average Total Snow Fall (in.) | 22.2 | 16.0 | 12.7 | 10.6 | 5.6 | 0.2 | 0.3 | 0.0 | 4.3 | 16.3 | 18.3 | 21.8 | 128.2 |
| Average Snow Depth (in.) | 25 | 29 | 29 | 21 | 3 | 0 | 0 | 0 | 0 | 3 | 9 | 15 | 11 |

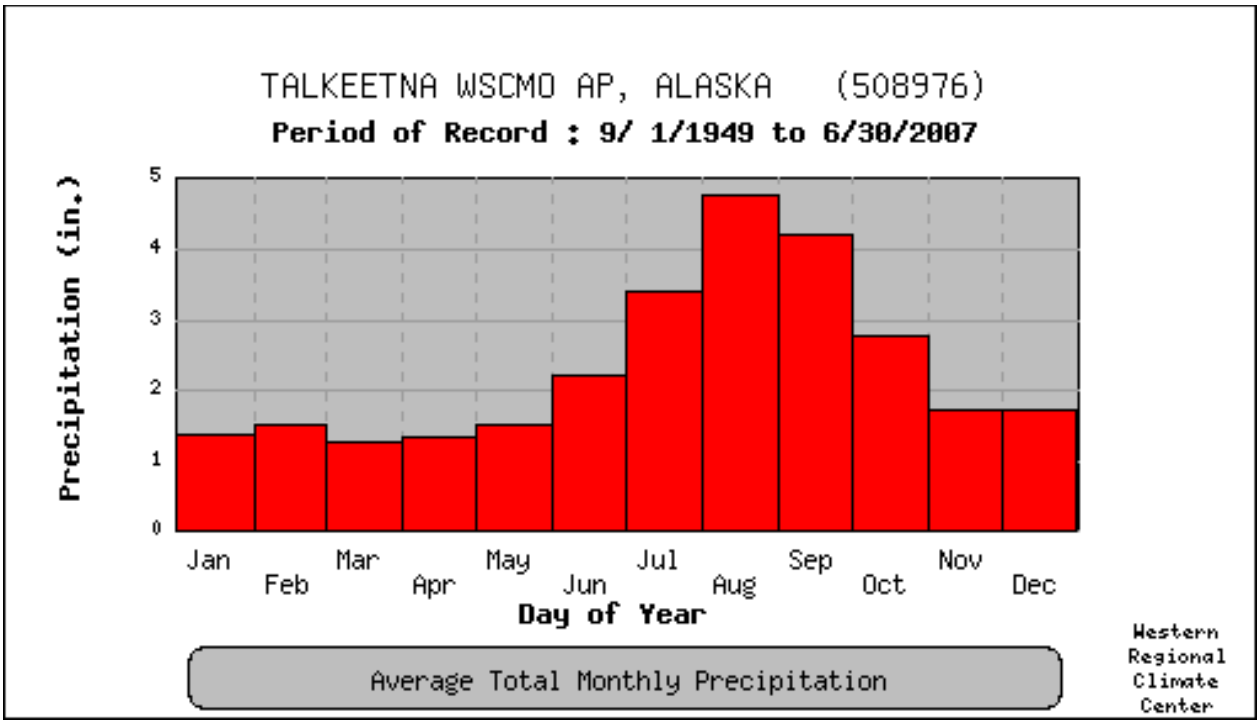

CANTWELL 2 E, ALASKA (501243)
Period of Record : 11/1/1983 to 6/30/2007
Temperature (F)
90
80
70
60
50
40
30
20
10
0
-10
-20
-30
-40
-50
Jan 1
Feb 1
Mar 1
Apr 1
May 1
Jun 1
Jul 1
Aug 1
Sep 1
Oct 1
Nov 1
Dec 1
Dec 31
Day of Year
Extreme Max
Ave Max
Ave Min
Extreme Min
Western Regional Climate Center


CANTWELL 2 E, ALASKA (501243)
Period of Record : 11/1/1983 to 6/30/2007
Precipitation (in.)
3.5
3
2.5
2
1.5
1
0.5
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Day of Year
Average Total Monthly Precipitation
Western Regional Climate Center

**Talkeetna Period of Record Monthly Climate Summary**
Period of Record: 9/ 1/1949 to 6/30/2007

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average Max. Temperature (F) | 19.7 | 26.1 | 33.5 | 44.7 | 56.8 | 65.8 | 68.0 | 64.7 | 55.5 | 39.9 | 26.1 | 20.4 | 43.4 |
| Average Min. Temperature (F) | 1.9 | 5.7 | 9.8 | 23.4 | 34.7 | 45.2 | 49.6 | 46.3 | 37.2 | 24.0 | 9.8 | 3.4 | 24.3 |
| Average Total Precipitation (in.) | 1.38 | 1.49 | 1.27 | 1.35 | 1.53 | 2.25 | 3.40 | 4.77 | 4.21 | 2.77 | 1.73 | 1.72 | 27.88 |
| Average Total Snow Fall (in.) | 18.6 | 20.0 | 17.1 | 9.2 | 0.9 | 0.0 | 0.0 | 0.0 | 1.2 | 11.6 | 19.2 | 22.8 | 120.6 |
| Average Snow Depth (in.) | 27 | 30 | 31 | 18 | 2 | 0 | 0 | 0 | 0 | 2 | 8 | 17 | 11 |

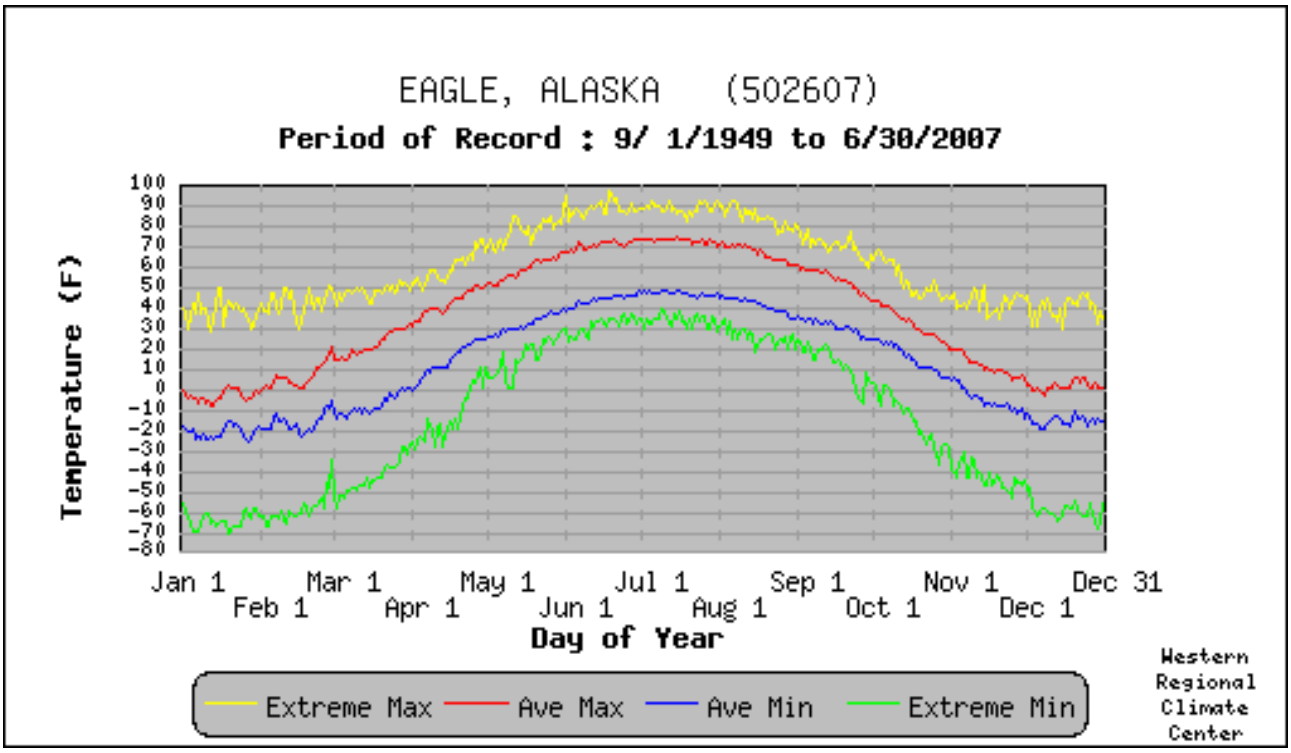


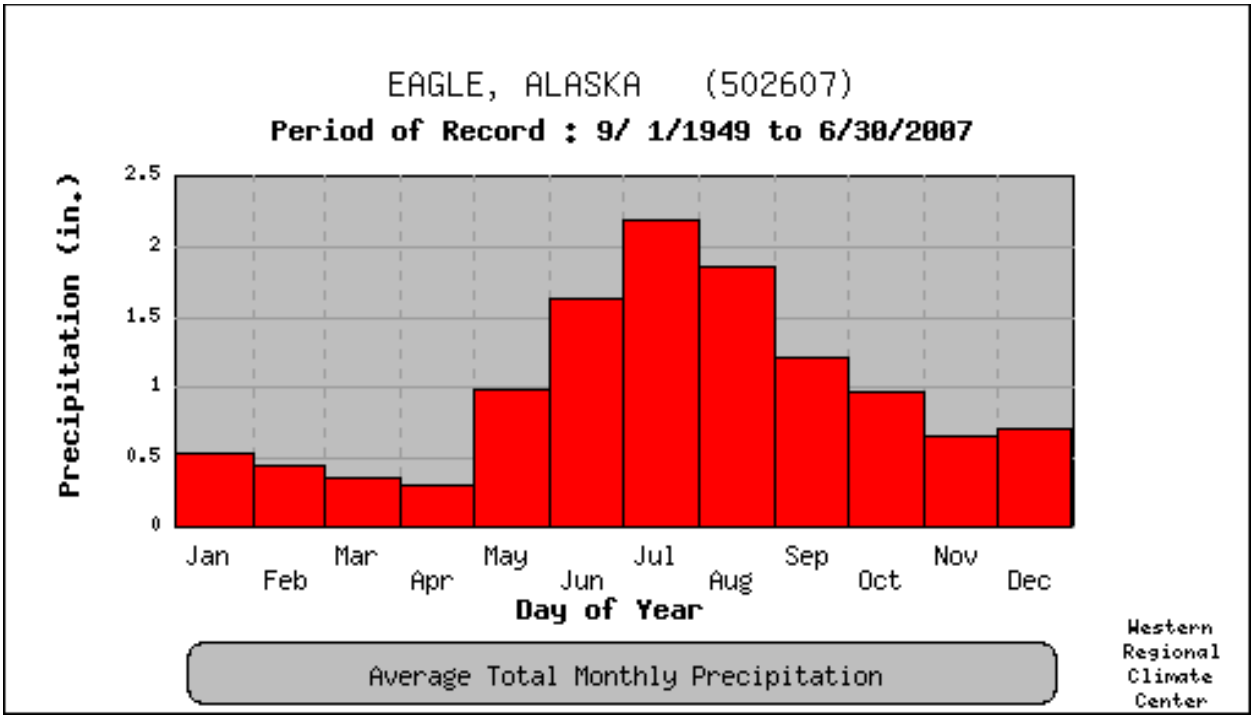



**Eagle Period of Record Monthly Climate Summary**

Period of Record: 9/ 1/1949 to 6/30/2007

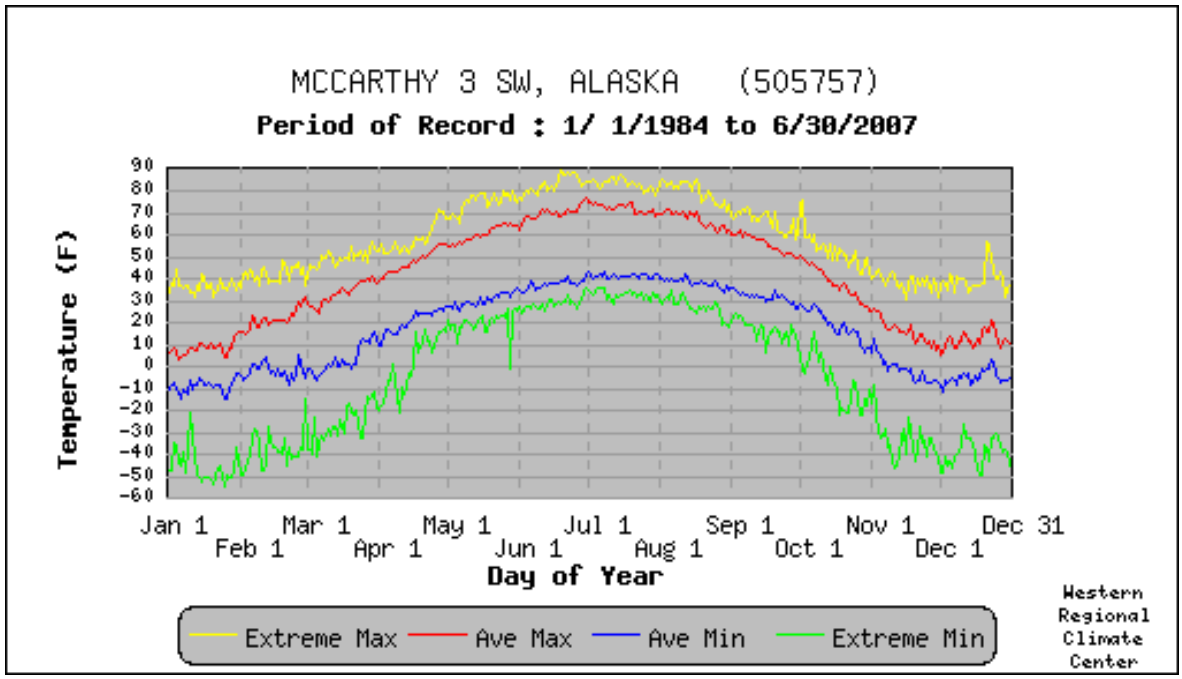
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average Max. Temperature (F) | -3.6 | 5.1 | 22.1 | 42.0 | 59.0 | 70.8 | 72.8 | 66.8 | 53.7 | 32.2 | 11.2 | 1.3 | 36.1 |
| Average Min. Temperature (F) | -21.4 | -17.1 | -8.0 | 14.0 | 31.8 | 43.7 | 47.0 | 41.1 | 30.6 | 15.1 | -5.3 | -15.7 | 13.0 |
| Average Total Precipitation (in.) | 0.53 | 0.43 | 0.36 | 0.31 | 0.99 | 1.65 | 2.21 | 1.87 | 1.24 | 0.97 | 0.67 | 0.71 | 11.94 |
| Average Total Snow Fall (in.) | 7.8 | 6.9 | 5.3 | 3.1 | 0.8 | 0.0 | 0.0 | 0.0 | 0.9 | 9.6 | 10.7 | 11.5 | 56.7 |
| Average Snow Depth (in.) | 17 | 20 | 21 | 13 | 0 | 0 | 0 | 0 | 0 | 2 | 8 | 13 | 8 |

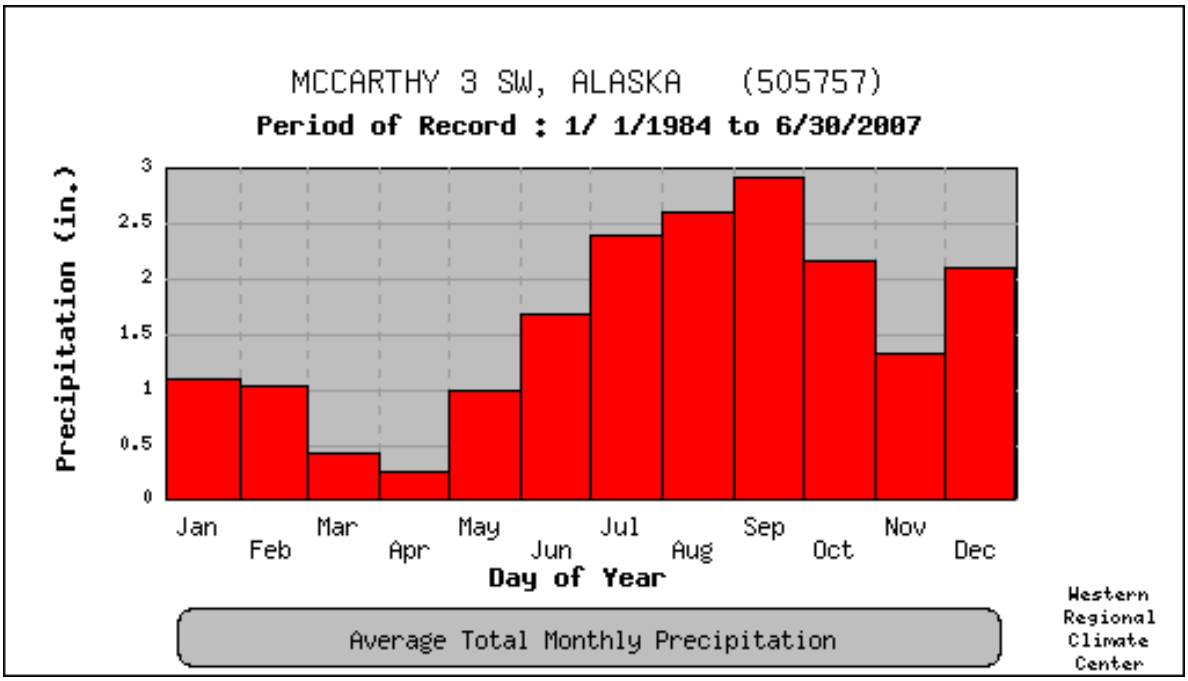

EAGLE, ALASKA (502607)
Period of Record : 9/ 1/1949 to 6/30/2007
Temperature (F)
100
90
80
70
60
50
40
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Jan 1
Feb 1
Mar 1
Apr 1
May 1
Jun 1
Jul 1
Aug 1
Sep 1
Oct 1
Nov 1
Dec 1
Dec 31
Day of Year
Extreme Max
Ave Max
Ave Min
Extreme Min
Western Regional Climate Center


EAGLE, ALASKA (502607)
Period of Record : 9/ 1/1949 to 6/30/2007
Precipitation (in.)
2.5
2
1.5
1
0.5
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Day of Year
Average Total Monthly Precipitation
Western Regional Climate Center

**McCarthy Period of Record Monthly Climate Summary**
Period of Record: 1/ 1/1984 to 6/30/2007

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average Max. Temperature (F) | 8.4 | 21.0 | 33.1 | 47.3 | 59.9 | 69.3 | 71.7 | 66.7 | 55.6 | 37.9 | 16.0 | 12.6 | 41.6 |
| Average Min. Temperature (F) | -8.9 | -2.1 | 2.9 | 20.2 | 29.7 | 37.4 | 41.1 | 38.0 | 31.0 | 18.7 | -1.7 | -4.1 | 16.9 |
| Average Total Precipitation (in.) | 1.14 | 1.04 | 0.42 | 0.26 | 1.01 | 1.68 | 2.37 | 2.60 | 2.94 | 2.19 | 1.37 | 1.99 | 19.0 |
| Average Total Snow Fall (in.) | 12.6 | 8.9 | 5.0 | 2.4 | 0.2 | 0.0 | 0.0 | 0.0 | 2.8 | 9.9 | 13.6 | 12.6 | 68.2 |
| Average Snow Depth (in.) | 17 | 22 | 23 | 13 | 0 | 0 | 0 | 0 | 0 | 2 | 8 | 13 | 8 |

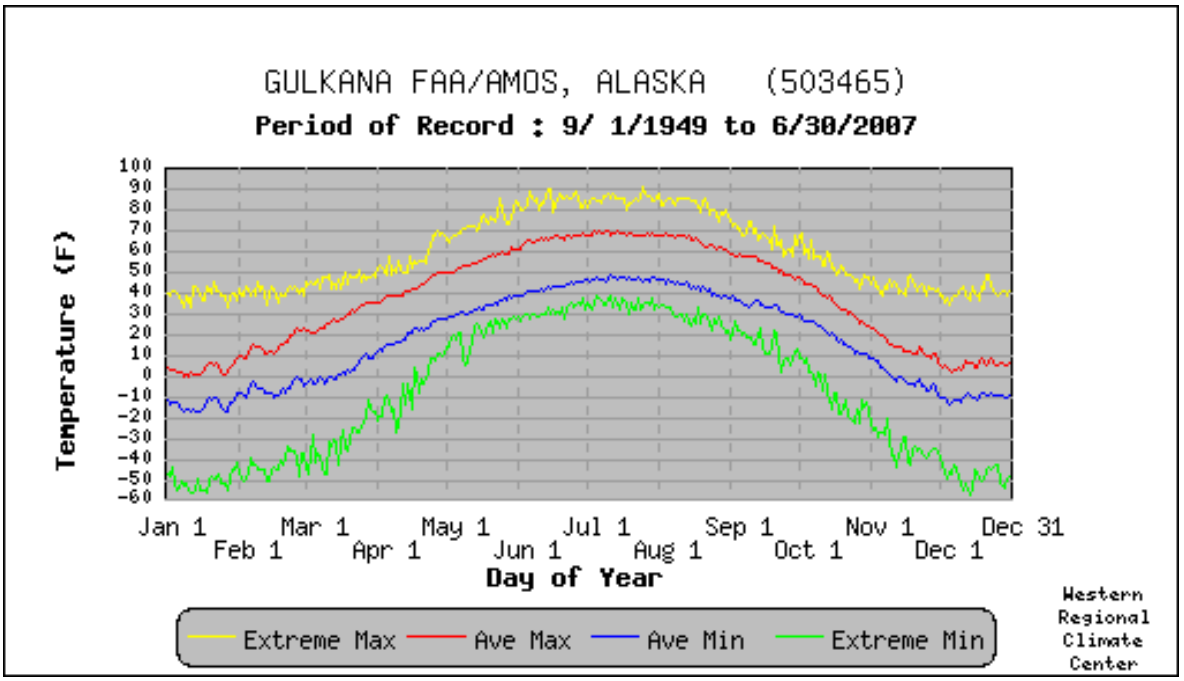


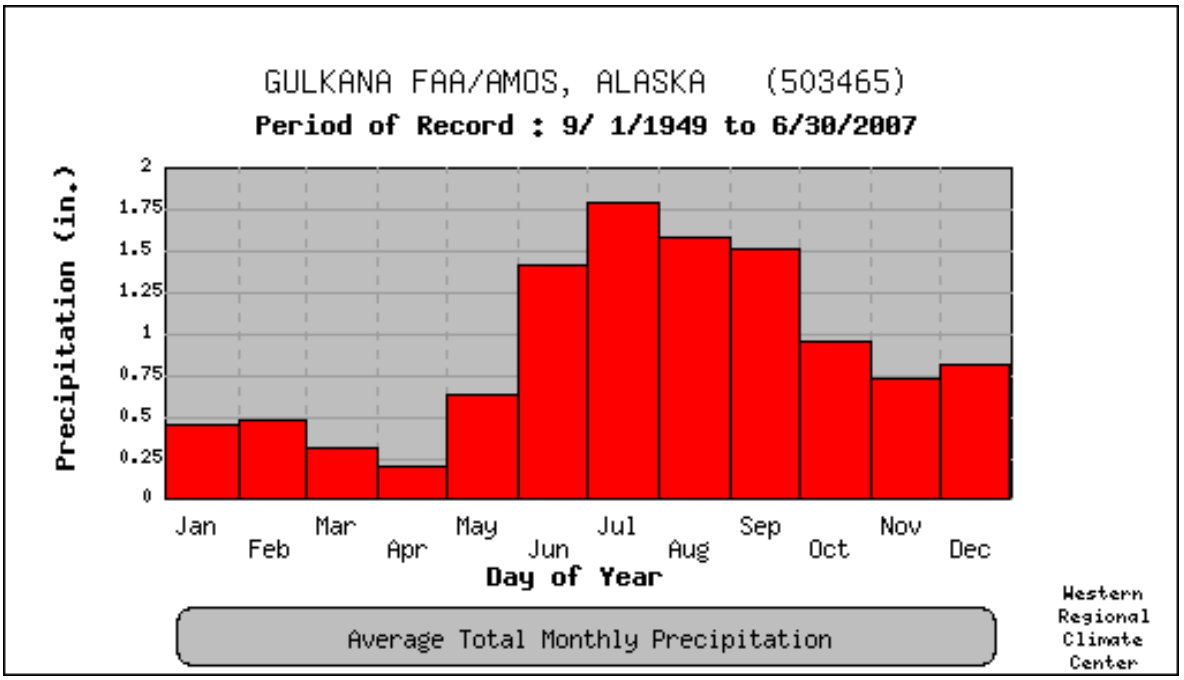



**Gulkana Period of Record Monthly Climate Summary**

Period of Record: 9/ 1/1949 to 6/30/2007

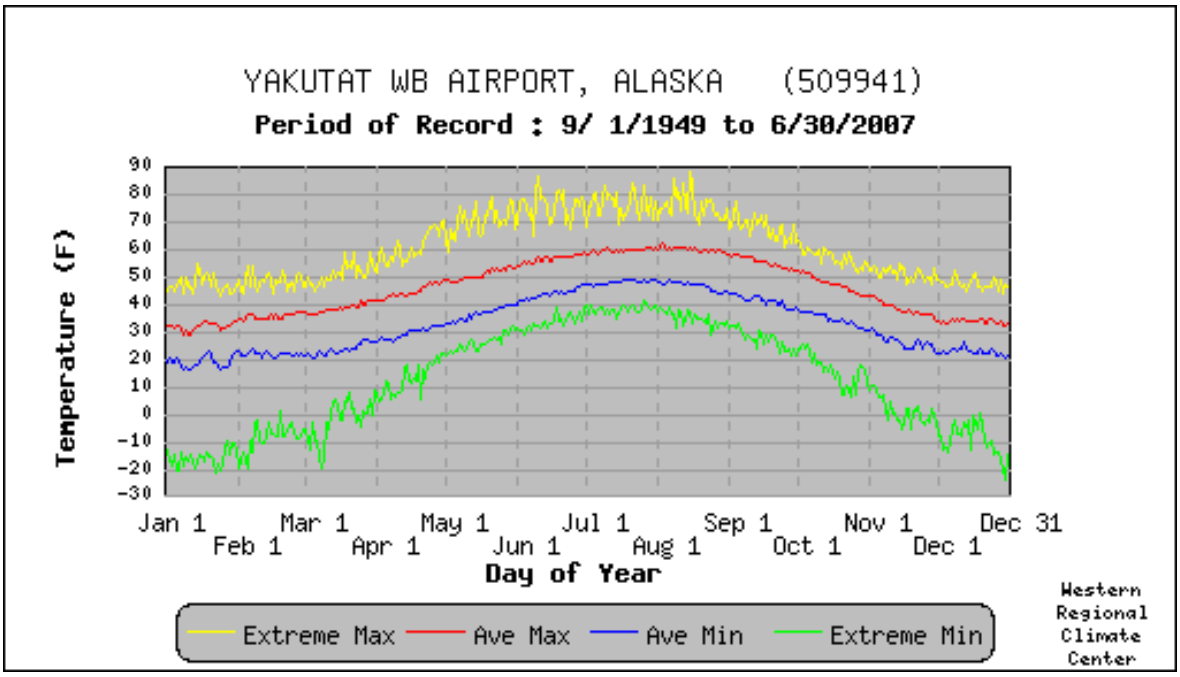
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average Max. Temperature (F) | 2.6 | 14.2 | 27.9 | 42.3 | 55.5 | 65.7 | 68.5 | 64.8 | 53.8 | 35.2 | 13.9 | 5.1 | 37.4 |
| Average Min. Temperature (F) | -14.1 | -6.8 | 1.5 | 19.7 | 32.8 | 42.3 | 46.3 | 42.3 | 33.2 | 18.6 | -1.5 | -10.7 | 17.0 |
| Average Total Precipitation (in.) | 0.46 | 0.49 | 0.31 | 0.20 | 0.65 | 1.42 | 1.80 | 1.60 | 1.54 | 0.96 | 0.73 | 0.83 | 10.99 |
| Average Total Snow Fall (in.) | 7.1 | 7.6 | 5.0 | 2.6 | 0.5 | 0.0 | 0.0 | 0.1 | 1.1 | 8.0 | 8.9 | 10.3 | 51.2 |
| Average Snow Depth (in.) | 14 | 16 | 14 | 5 | 0 | 0 | 0 | 0 | 0 | 2 | 6 | 11 | 6 |

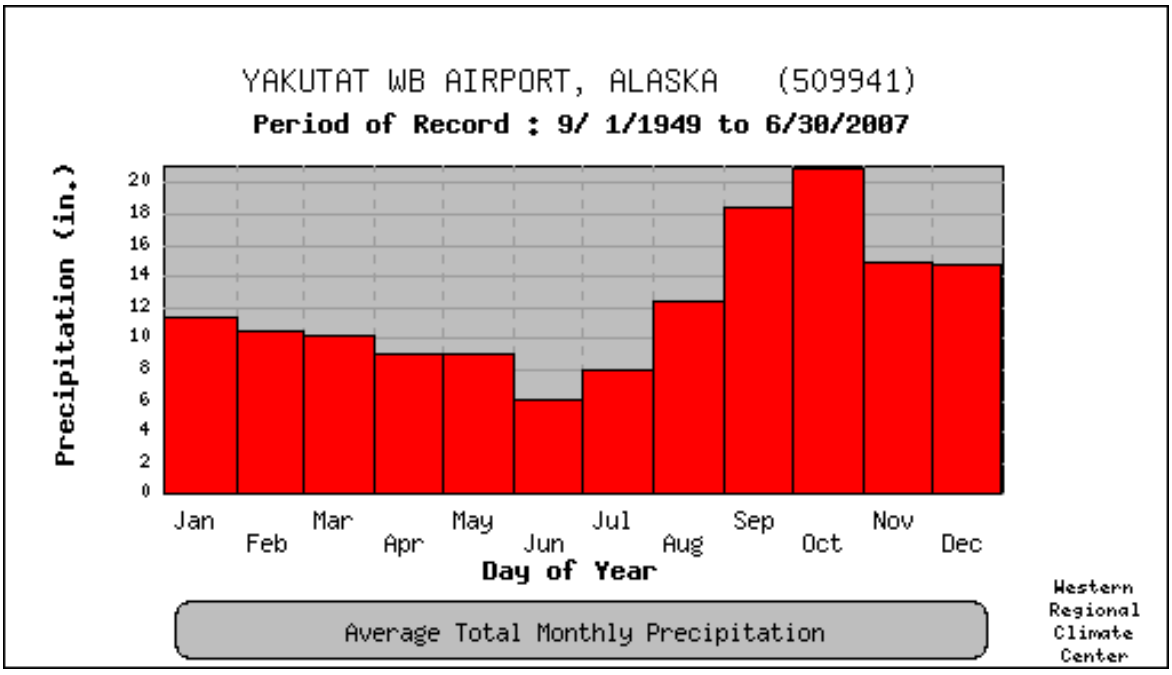

GULKANA FAA/AMOS, ALASKA (503465)
Period of Record : 9/ 1/1949 to 6/30/2007
Temperature (F)
100
90
80
70
60
50
40
30
20
10
0
-10
-20
-30
-40
-50
-60
Jan 1
Feb 1
Mar 1
Apr 1
May 1
Jun 1
Jul 1
Aug 1
Sep 1
Oct 1
Nov 1
Dec 1
Dec 31
Day of Year
Extreme Max
Ave Max
Ave Min
Extreme Min
Western Regional Climate Center


GULKANA FAA/AMOS, ALASKA (503465)
Period of Record : 9/ 1/1949 to 6/30/2007
Precipitation (in.)
2
1.75
1.5
1.25
1
0.75
0.5
0.25
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Day of Year
Average Total Monthly Precipitation
Western Regional Climate Center

**Yakutat Period of Record Monthly Climate Summary**
Period of Record: 9/ 1/1949 to 6/30/2007

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average Max. Temperature (F) | 31.6 | 35.5 | 38.4 | 44.5 | 50.8 | 56.5 | 59.8 | 60.2 | 55.4 | 47.3 | 38.3 | 33.9 | 46.0 |
| Average Min. Temperature (F) | 18.7 | 21.7 | 23.2 | 29.3 | 36.5 | 43.7 | 48.0 | 46.7 | 41.1 | 34.4 | 26.2 | 22.5 | 32.7 |
| Average Total Precipitation (in.) | 11.34 | 10.42 | 10.25 | 9.06 | 8.94 | 5.99 | 8.03 | 12.33 | 18.34 | 20.96 | 14.88 | 14.72 | 145.3 |
| Average Total Snow Fall (in.) | 35.1 | 35.3 | 36.8 | 15.4 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 4.9 | 21.9 | 36.3 | 186.7 |
| Average Snow Depth (in.) | 14 | 16 | 20 | 10 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 9 | 6 |




YAKUTAT WB AIRPORT, ALASKA (509941)
Period of Record : 9/ 1/1949 to 6/30/2007
Precipitation (in.)
0
2
4
6
8
10
12
14
16
18
20
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Day of Year
Average Total Monthly Precipitation
Western Regional Climate Center

## Appendix B: 2007 Extremes at Long-term Stations

Daily summary stats retrieved from:
http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ak5778

Monthly summary stats retrieved from:
http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ak5778

**McKinley Park - 2007 Records – 83 years**

| | | |
|---|---|---|
| Record High Temperatures °F | 52*, 51 | Feb 1, 2 |
| | 52 | Apr 7, 9 |
| | 69 | Aug 30 |
| Record Low Temperatures °F | -32 | Feb 24 |
| | -31 | Mar 3 |
| | -31 | Mar 16 |
| Record High Precipitation – In. | 0.57 | May 29 |
| | 1.30 | Aug 7 |
| | 0.94 | Aug 13 |
| Record High Snowfall – In. | 2.0 | Dec 12 |
| *All time high temp for February | 52 | Feb 1 |
| Coldest March on record | -5.2 | 2007 |

**Talkeetna – 2007 Records – 57 years**

| | | |
|---|---|---|
| Record High Temperatures °F | 40, 44 | Jan 29, 31 |
| | 47, 40 | Feb 1, 2 |
| | 52 | Apr 6 |
| | 59, 58 | Apr 21, 22 |
| | 86, 87 | Jun 19, 20 |
| | 71 | Aug 29 |
| | 46 | Nov 1 |
| Record Low temperatures °F | -19, -8 | Mar 25, 27 |
| Record High Precipitation – In. | 1.95 | Sep 8 |
| | 1.00 | Dec 4 |
| Driest April on record | 0.02 | April |

**Cantwell – 2007 records – 24 years**

| | | |
|---|---|---|
| Record High Temperatures °F | 37, 40 | Jan 29, 30 |
| | 44 | Feb 2 |
| | 46, 49 | Apr 6, 8 |
| | 81 | Jun 29 |
| | 77, 78 | Jul 25, 26 |
| | 73, 71, 69 | Aug 26, 28, 30 |
| | 37, 39 | Oct 31, Nov 1 |

| | | |
|---|---|---|
| | 38, 39, 42 | Nov 20, 21, 22 |
| Record Low temperatures °F | -43 | Feb 23 |
| | -37 | Feb 28 |
| | -22, -23 | Mar 18, 19 |
| | 30 | Jun 27 |
| | 29 | Jul 12 |
| | 31 | Jul 24 |
| | 29, 26, 28 | Aug 9, 10 |
| Record Precipitation | .09, 0.39 | Feb 16, 17 |
| | 0.01 | Mar 21 |
| | 0.08 | May 6 |
| | 0.11 | May 12 |
| | 0.19, 0.58 | May 27, 28 |
| | 0.14 | Jun 4 |
| | 0.56 | Aug 14 |
| Record Snowfall – In. | 2.3 | May 12 |
| | 4.0 | Oct 23 |
| | 3.0 | Dec 5 |
| Coldest March on record | -2.2 | 2007 |
| Driest April on record | 0.03 | 2007 |

**Eagle – 2007 Records -52 years**

| | | |
|---|---|---|
| Record High Temperatures °F | 58 | Apr 8, 10 |
| | 63 | Apr 23 |
| | 89 | Jun 5 |
| | 86 | Jul 21 |
| Record Low temperatures °F | -56, -54 | Feb 24, 25 |
| | -52 | Mar 3 |
| Record Precipitation – In. | 0.26 | Mar 7 |
| | 0.09 | Mar 15 |
| | 0.09 | Mar 24 |
| | 0.12 | May 5 |
| | 0.70 | Aug 5 |
| | 0.19 | Nov 24 |
| | 0.14 | Dec 26 |
| Record snowfall – In. | 3.0 | Jan 16 |
| | 4.0 | Jan 24 |
| | 2.5 | Mar 22 |
| | 3.0 | Dec 26 |
| Most snowfall in January - In. | 21 | 2007 |
| Coldest March on Record °F | -10.3 | 2007 |
| Warmest July on record | 64.1 | 2007 |
| Wettest August on record | 4.75 | 2007 |

**McCarthy 2007 Records – 22 years of data**

| | | |
|---|---|---|
| Record high Temperatures °F | 34 | Jan 26 |
| | 53, 56, 53 | Apr 7, 8, 9 |
| | 55 | Apr 21 |
| | 82 | Jun 28 |
| | 71 | Aug 30 |
| | 68, 67 | Sep 12, 13 |
| | 43 | Nov 1 |
| Record Low Temperatures °F | -42, -41, -37, -38 | Feb 23, 25, 27, 28 |
| | -38, -40, | Mar 1, 3 |
| | -14, -15, -14, -12 | Mar 27, 28, 29, 30 |
| | 17 | Apr 21 |
| | -1 | May 28 |
| Record Precipitation | 0.12 | Jan 23 |
| | 0.18, 0.04 | May 10, 12 |
| | 0.75 | May 17 |
| | 0.50 | May 26 |
| | 0.09, 0.48 | Jun 30, Jul 1 |
| | 0.81, 1.12 | Sep 9, 10 |
| | 1.07 | Sep 19 |
| | 0.32 | Oct 25 |
| | 1.09 | Nov 14 |
| Record Snowfall – In. | 2.6 | Jan 14 |
| | 1.2 | Jan 23 |
| | 0.8 | Mar 14 |
| | 4.4 | Oct 24 |
| | 15.1 | Nov 13 |
| | 2.0 | Dec 17 |
| Driest February In. | 0.05 | 2007 |
| Coldest March °F | 4.4 | 2007 |
| Wettest May – In. | 2.50 | 2007 |
| Driest June – In. | 0.28 | 2007 |

**Yakutat 200 7records – 59 years of data**

| | | |
|---|---|---|
| Record High temperatures °F: | 71 | Aug 28 |
| Record Low temperatures °F | -3 | Mar 4 |
| | 8 | Mar 20 |
| | 9 | Mar 31 |
| Record precipitation – Inches | 1.35 | Mar 21 |
| | 2.86 | May 30 |
| Record Snowfall – In. | 13.5, 11.4 | Mar 13, 14 |
| Driest August on Record – In. | 2.40 | August Total |
| Driest Summer on Record – In. | 8.46 | Summer Total |

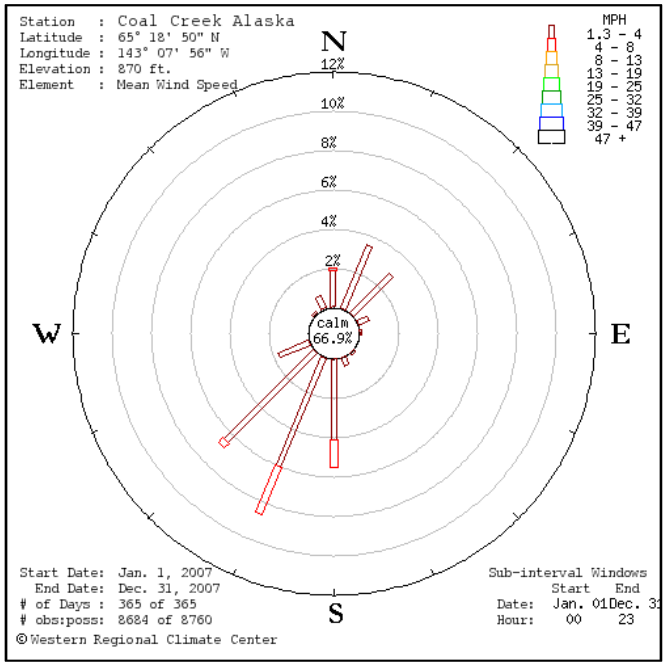
**Gulkana 2007 records – 57 years of data**

| | | |
|---|---|---|
| Record High temperatures °F | 51 | Apr 8 |
| Record Low temperatures °F | -37 | Feb 22, 23 |
| | -33, -26 | Mar 16, 17 |
| | -20 | Mar 27 |
| | 37 | Jul 17 |
| Record precipitation - Inches | 0.14 | Jan 22 |
| | 0.18 | Mar 21 |
| | 0.29 | May 5 |
| | 0.41 | Jul 1 |
| | 0.42 | Sep 16 |
| | 0.26 | Dec 11 |
| Coldest March on Record | 0 | March Mean |

# Appendix C: CAKN Climate Station Monthly Data

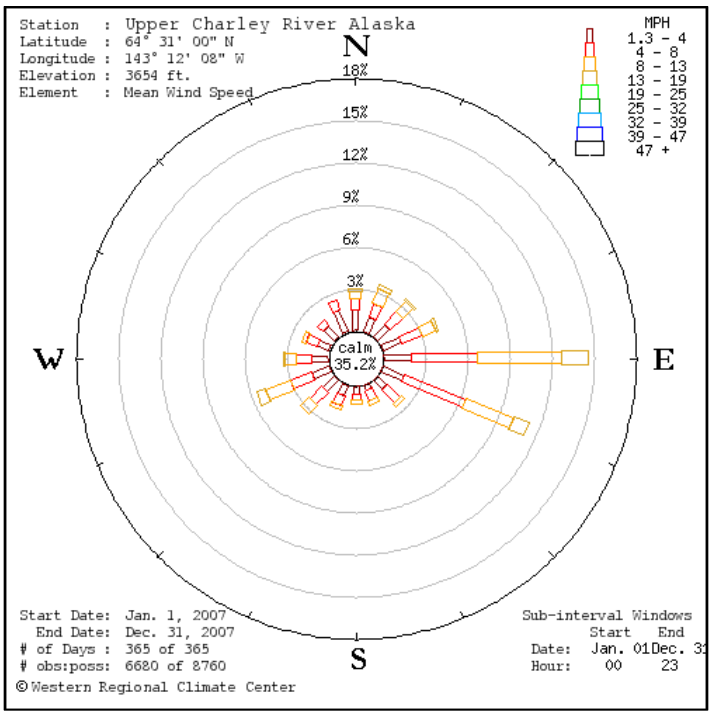
## Coal Creek Alaska

| | Solar Radiation | Mean Wind Speed | Mean Wind Direction | Maximum Wind Gust | Average Air Temperature | | | Average Soil Temperature - 20 Inches | | | Average Relative Humidity | | | Snow Depth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | ly | mph | Deg | mph | Deg F | | | Deg F | | | % | | | in |
| mm/yyyy | Total | Ave. | Ave. | Max. | Ave. | Max. | Min. | Ave. | Max. | Min. | Ave. | Max. | Min. | Ave. |
| 01/2007 | 25 | 1 | 111 | 10 | -3 | 30 | -47 | 24 | 25 | 23 | 79 | 91 | 60 | 13 |
| 02/2007 | 1224 | 1 | 194 | 8 | -17 | 29 | -52 | 20 | 24 | 14 | 69 | 93 | 40 | 12 |
| 03/2007 | 3191 | 2 | 211 | 10 | -9 | 34 | -47 | 15 | 16 | 14 | 62 | 85 | 26 | 14 |
| 04/2007 | 9570 | 2 | 226 | 10 | 35 | 59 | -7 | 23 | 28 | 16 | 54 | 95 | 14 | 7 |
| 05/2007 | 12645 | 2 | 222 | 13 | 49 | 76 | 21 | 29 | 30 | 0 | 49 | 97 | 12 | 0 |
| 06/2007 | 13667 | 1 | 220 | 11 | 60 | 83 | 36 | 30 | 31 | 0 | 53 | 96 | 13 | 0 |
| 07/2007 | 12426 | 1 | 207 | 83 | 62 | 80 | 43 | 31 | 31 | 30 | 65 | 100 | 17 | 0 |
| 08/2007 | 9312 | 1 | 194 | 9 | 55 | 83 | 33 | 32 | 33 | 31 | 77 | 100 | 25 | 1 |
| 09/2007 | 4740 | 1 | 245 | 9 | 41 | 66 | 19 | 32 | 32 | 0 | 80 | 100 | 31 | 1 |
| 10/2007 | 1357 | 1 | 203 | 9 | 18 | 45 | -8 | 31 | 31 | 0 | 87 | 98 | 48 | 4 |
| 11/2007 | 121 | 1 | 186 | 11 | 11 | 38 | -20 | 31 | 31 | 31 | 84 | 98 | 53 | 6 |
| 12/2007 | 32 | 1 | 158 | 10 | -7 | 23 | -41 | 30 | 31 | 27 | 78 | 95 | 45 | 9 |



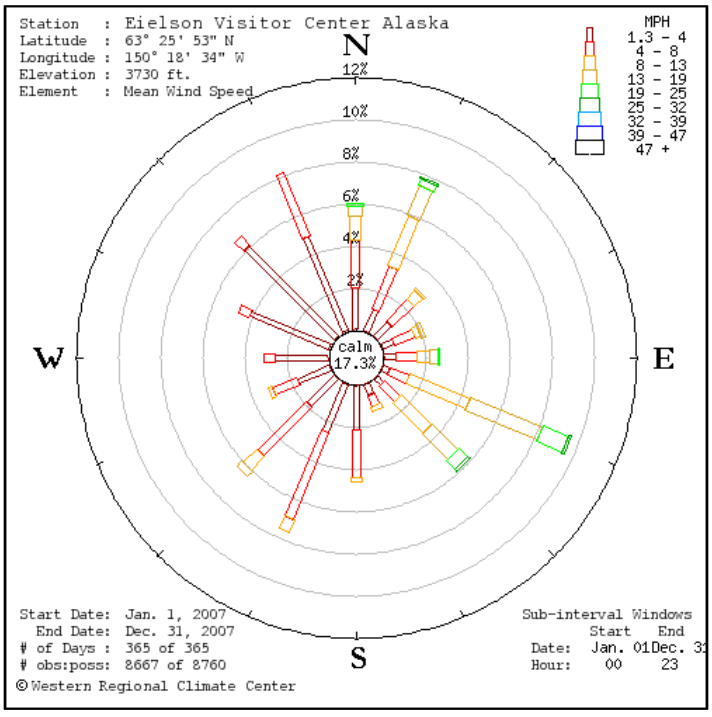
## Upper Charley River Alaska

| | Solar Radiation | Mean Wind Speed | Mean Wind Direction | Maximum Wind Gust | Average Air Temperature | | | Average Soil Temperature - 20 Inches | | | Average Relative Humidity | | | Snow Depth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | ly | mph | Deg | mph | Deg F | | | Deg F | | | % | | | in |
| mm/yyyy | Total | Ave. | Ave. | Max. | Ave. | Max. | Min. | Ave. | Max. | Min. | Ave. | Max. | Min. | Ave. |
| 01/2007 | 98 | 1 | 47 | 22 | -4 | 24 | -30 | m | m | m | 49 | 100 | m | 14 |
| 02/2007 | 2329 | 6 | 89 | 23 | -5 | 27 | -37 | m | m | m | 27 | 100 | 0 | 15 |
| 03/2007 | 6771 | 4 | 6 | 21 | -8 | 27 | -34 | m | m | m | m | m | m | 15 |
| 04/2007 | 11978 | 6 | 114 | 34 | 30 | 46 | 10 | m | m | m | m | m | m | 13 |
| 05/2007 | 5885 | 6 | 351 | 28 | 35 | 47 | 25 | m | m | m | m | m | m | 7 |
| 06/2007 | 10900 | 5 | 330 | 26 | 52 | 68 | 36 | m | m | m | 60 | 98 | 15 | 4 |
| 07/2007 | 12054 | 4 | 311 | 29 | 54 | 67 | 45 | m | m | m | 73 | 100 | 32 | 0 |
| 08/2007 | 8022 | 5 | 216 | 23 | 51 | 71 | 37 | m | m | m | 50 | 100 | 2 | 2 |
| 09/2007 | 12 | 2 | 253 | 3 | 31 | 31 | 31 | m | m | m | 100 | 100 | 100 | 3 |
| 10/2007 | 298 | 4 | 97 | 19 | 17 | 31 | 3 | m | m | m | 96 | 99 | 88 | 4 |
| 11/2007 | 304 | 4 | 83 | 22 | 14 | 28 | 2 | m | m | m | 94 | 100 | 79 | 7 |
| 12/2007 | 74 | 3 | 65 | 24 | -2 | 19 | -24 | m | m | m | 84 | 96 | 37 | 10 |



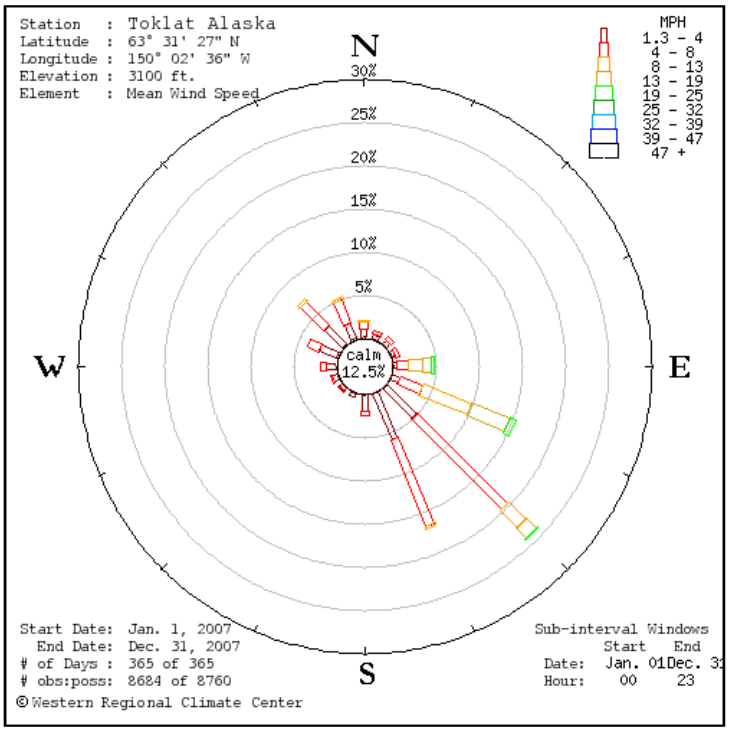
## Eielson Visitor Center Alaska

| | Solar Radiation | Mean Wind Speed | Mean Wind Direction | Maximum Wind Gust | Average Air Temperature | | | Average Relative Humidity | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Date | ly | mph | Deg | mph | Deg F | | | % | | |
| mm/yyyy | Total | Ave. | Ave. | Max. | Ave. | Max. | Min. | Ave. | Max. | Min. |
| 01/2007 | 451 | 6 | 340 | 43 | 10 | 50 | -28 | 61 | 94 | 11 |
| 02/2007 | 2385 | 5 | 316 | 31 | 15 | 51 | -14 | 54 | 99 | 10 |
| 03/2007 | 7569 | 5 | 278 | 34 | -3 | 36 | -27 | 60 | 90 | 16 |
| 04/2007 | 11766 | 7 | 91 | 37 | 33 | 46 | 19 | 52 | 100 | 17 |
| 05/2007 | 14647 | 5 | 167 | 41 | 40 | 61 | 24 | 66 | 100 | 19 |
| 06/2007 | 13263 | 5 | 202 | 24 | 48 | 64 | 34 | 68 | 100 | 22 |
| 07/2007 | 10839 | 4 | 221 | 17 | 51 | 63 | 41 | 82 | 100 | 35 |
| 08/2007 | 10076 | 5 | 202 | 24 | 50 | 68 | 41 | 75 | 100 | 31 |
| 09/2007 | 6449 | 5 | 169 | 36 | 40 | 56 | 29 | 71 | 100 | 14 |
| 10/2007 | 2991 | 4 | 311 | 95 | 24 | 37 | 5 | 69 | 100 | 19 |
| 11/2007 | 752 | 8 | 37 | 36 | 25 | 51 | -4 | 63 | 100 | 11 |
| 12/2007 | 168 | 7 | 343 | 38 | 13 | 51 | -17 | 63 | 98 | 7 |



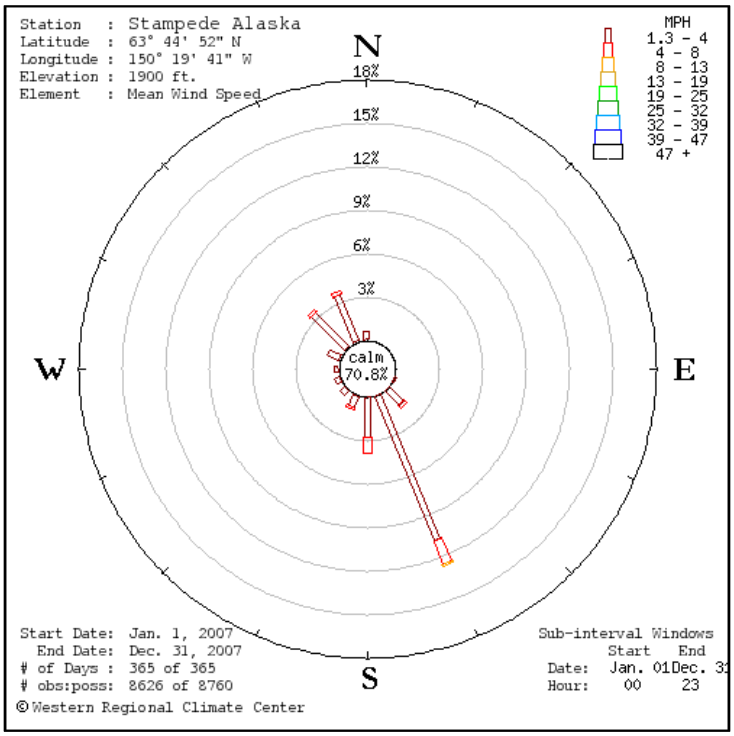
## Toklat Alaska

| | Solar Radiation | Mean Wind Speed | Mean Wind Direction | Maximum Wind Gust | Average Air Temperature | | | Average Soil Temperature – 4 Inches | | | Average Relative Humidity | | | Snow Depth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | ly | mph | Deg | mph | Deg F | | | Deg F | | | % | | | in |
| mm/yyyy | Total | Ave. | Ave. | Max. | Ave. | Max. | Min. | Ave. | Max. | Min. | Ave. | Max. | Min. | Ave. |
| 01/2007 | 365 | 6 | 139 | 36 | 7 | 52 | -31 | 20 | 29 | 16 | 66 | 91 | 17 | 4 |
| 02/2007 | 1948 | 5 | 148 | 33 | 5 | 50 | -31 | 17 | 30 | 8 | 70 | 98 | 19 | 2 |
| 03/2007 | 6370 | 4 | 150 | 26 | -8 | 35 | -34 | 14 | 19 | 11 | 64 | 87 | 21 | 4 |
| 04/2007 | 10253 | 8 | 125 | 31 | 32 | 47 | 8 | 30 | 43 | 0 | 56 | 98 | 21 | 1 |
| 05/2007 | 12860 | 5 | 127 | 25 | 42 | 64 | 19 | 42 | 59 | 32 | 63 | 99 | 18 | 1 |
| 06/2007 | 13484 | 5 | 129 | 22 | 51 | 66 | 37 | 53 | 66 | 0 | 63 | 98 | 17 | 5 |
| 07/2007 | 10879 | 3 | 140 | 18 | 53 | 66 | 39 | 56 | 65 | 46 | 77 | 98 | 32 | 7 |
| 08/2007 | 9332 | 4 | 129 | 19 | 51 | 72 | 37 | 52 | 63 | 43 | 75 | 100 | 28 | 7 |
| 09/2007 | 5663 | 5 | 139 | 42 | 41 | 57 | 26 | 41 | 53 | 32 | 73 | 100 | 27 | 1 |
| 10/2007 | 2603 | 5 | 151 | 26 | 20 | 37 | 0 | 31 | 32 | 27 | 77 | 100 | 34 | 6 |
| 11/2007 | 619 | 7 | 138 | 33 | 22 | 41 | -8 | 28 | 30 | 25 | 69 | 98 | 23 | 7 |
| 12/2007 | 121 | 6 | 146 | 31 | 10 | 49 | -28 | 25 | 28 | 0 | 70 | 95 | 8 | 7 |



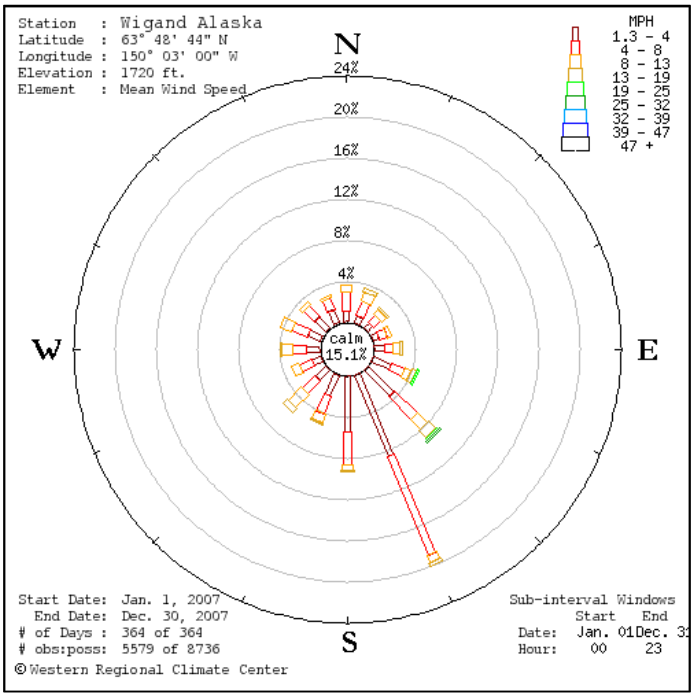
## Stampede Alaska

| | Solar Radiation | Mean Wind Speed | Mean Wind Direction | Maximum Wind Gust | Average Air Temperature | | | Average Soil Temperature – 4 Inches | | | Average Relative Humidity | | | Snow Depth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | ly | mph | Deg | mph | Deg F | | | Deg F | | | % | | | in |
| mm/yyyy | Total | Ave. | Ave. | Max. | Ave. | Max. | Min. | Ave. | Max. | Min. | Ave. | Max. | Min. | Ave. |
| 01/2007 | 125 | 0 | 224 | 17 | -2 | 57 | -44 | m | m | m | 79 | 95 | 19 | 9 |
| 02/2007 | 656 | 1 | 191 | 11 | -4 | 47 | -41 | m | m | m | 77 | 94 | 30 | 9 |
| 03/2007 | 2792 | 1 | 175 | 13 | -9 | 36 | -43 | m | m | m | 64 | 89 | 18 | 12 |
| 04/2007 | 9424 | 2 | 153 | 20 | 34 | 54 | 0 | m | m | m | 60 | 97 | 19 | 5 |
| 05/2007 | 11891 | 2 | 158 | 14 | 45 | 72 | 24 | m | m | m | 62 | 99 | 15 | 0 |
| 06/2007 | 12544 | 2 | 157 | 12 | 54 | 74 | 31 | 57 | 71 | 49 | 66 | 99 | 20 | 0 |
| 07/2007 | 11443 | 1 | 138 | 195 | 56 | 74 | 40 | 60 | 72 | 52 | 77 | 99 | 28 | 0 |
| 08/2007 | 9031 | 1 | 166 | 8 | 53 | 74 | 34 | 56 | 68 | 45 | 81 | 100 | 27 | 0 |
| 09/2007 | 5312 | 1 | 154 | 9 | 41 | 65 | 21 | 44 | 58 | 33 | 84 | 100 | 26 | 0 |
| 10/2007 | 1191 | 1 | 238 | 17 | 17 | 41 | -5 | 31 | 37 | 0 | 87 | 100 | 50 | 4 |
| 11/2007 | 437 | 1 | 168 | 17 | 14 | 44 | -13 | 26 | 29 | 22 | 83 | 97 | 32 | 8 |
| 12/2007 | 67 | 0 | 1 | 9 | 0 | 28 | -39 | 21 | 24 | 16 | 83 | 97 | 53 | 12 |



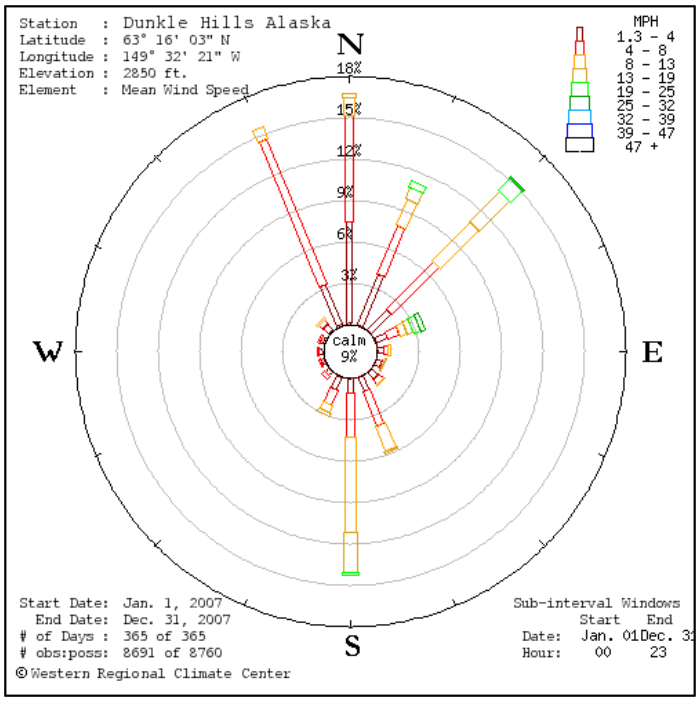
## Wigand Alaska

| | Solar Radiation | Mean Wind Speed | Mean Wind Direction | Maximum Wind Gust | Average Air Temperature | | | Average Soil Temperature – 4 Inches | | | Average Relative Humidity | | | Snow Depth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | ly | mph | Deg | mph | Deg F | | | Deg F | | | % | | | in |
| mm/yyyy | Total | Ave. | Ave. | Max. | Ave. | Max. | Min. | Ave. | Max. | Min. | Ave. | Max. | Min. | Ave. |
| 01/2007 | 329 | 4 | 163 | 42 | 0 | 51 | -40 | 22 | 31 | 17 | 0 | 0 | 0 | 12 |
| 02/2007 | 1075 | 3 | 168 | 39 | -3 | 48 | -40 | 14 | 31 | 0 | 0 | 0 | 0 | 9 |
| 03/2007 | 4141 | 4 | 176 | 24 | -11 | 29 | -41 | 7 | 11 | 4 | 0 | 0 | 0 | 9 |
| 04/2007 | 10532 | 6 | 149 | 38 | 35 | 54 | 1 | 26 | 32 | 11 | 0 | 1 | 0 | 7 |
| 05/2007 | 12628 | 6 | 185 | 25 | 45 | 70 | 22 | 35 | 46 | 30 | 1 | 3 | 0 | 6 |
| 06/2007 | 12930 | 6 | 199 | 26 | 54 | 73 | 33 | 44 | 53 | 35 | 46 | 97 | 0 | 2 |
| 07/2007 | 5912 | 5 | 218 | 20 | 56 | 74 | 36 | 49 | 55 | 43 | 73 | 98 | 30 | 0 |
| 08/2007 | 2286 | 4 | 111 | 22 | 51 | 66 | 33 | 46 | 50 | 40 | 75 | 99 | 38 | 1 |
| 09/2007 | 5348 | 4 | 152 | 32 | 42 | 65 | 22 | 39 | 48 | 31 | 79 | 100 | 18 | 0 |
| 10/2007 | 107 | 2 | 172 | 6 | 32 | 40 | 22 | 31 | 32 | 31 | 92 | 100 | 69 | 1 |
| 11/2007 | m | m | m | m | m | m | m | m | m | m | m | m | m | m |
| 12/2007 | m | m | m | m | m | m | m | m | m | m | m | m | m | m |



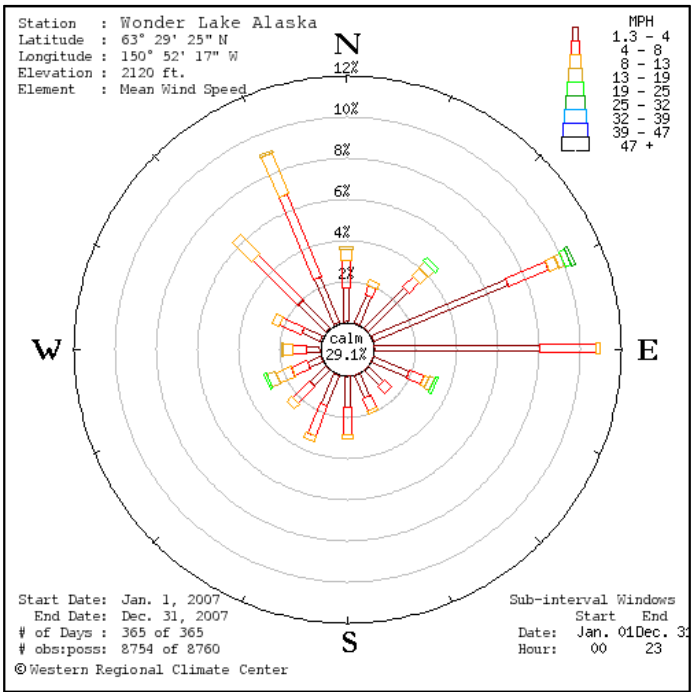
## Dunkle Hills Alaska

| | Solar Radiation | Mean Wind Speed | Mean Wind Direction | Maximum Wind Gust | Average Air Temperature | | | Average Soil Temperature - 5 Inches | | | Average Relative Humidity | | | Snow Depth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | ly | mph | Deg | mph | Deg F | | | Deg F | | | % | | | in |
| mm/yyyy | Total | Ave. | Ave. | Max. | Ave. | Max. | Min. | Ave. | Max. | Min. | Ave. | Max. | Min. | Ave. |
| 01/2007 | 597 | 7 | 28 | 27 | 9 | 35 | -20 | 20 | 24 | 15 | 80 | 96 | 52 | 18 |
| 02/2007 | 3489 | 8 | 15 | 32 | 6 | 34 | -20 | 21 | 24 | 15 | 67 | 93 | 22 | 17 |
| 03/2007 | 9229 | 11 | 24 | 38 | -2 | 27 | -23 | 12 | 16 | 8 | 63 | 89 | 27 | 14 |
| 04/2007 | 13018 | 5 | 2 | 31 | 30 | 44 | 8 | 24 | 31 | 14 | 67 | 93 | 39 | 10 |
| 05/2007 | 14121 | 6 | 217 | 26 | 40 | 66 | 23 | 37 | 47 | 29 | 68 | 97 | 22 | 0 |
| 06/2007 | 14403 | 6 | 148 | 27 | 50 | 73 | 33 | 47 | 57 | 39 | 66 | 97 | 22 | 0 |
| 07/2007 | 12446 | 6 | 165 | 22 | 51 | 70 | 34 | 51 | 58 | 46 | 79 | 97 | 32 | 1 |
| 08/2007 | 10502 | 6 | 152 | 23 | 50 | 73 | 34 | 50 | 57 | 43 | 79 | 100 | 27 | 0 |
| 09/2007 | 5769 | 5 | 58 | 23 | 40 | 55 | 23 | 41 | 50 | 34 | 84 | 100 | 34 | 0 |
| 10/2007 | 3216 | 4 | 17 | 24 | 23 | 40 | 3 | 33 | 35 | 32 | 84 | 100 | 42 | 7 |
| 11/2007 | 804 | 5 | 26 | 25 | 22 | 39 | 5 | 31 | 32 | 0 | 86 | 100 | 52 | 13 |
| 12/2007 | 232 | 7 | 16 | 35 | 10 | 41 | -23 | 31 | 31 | 30 | 77 | 99 | 16 | 22 |



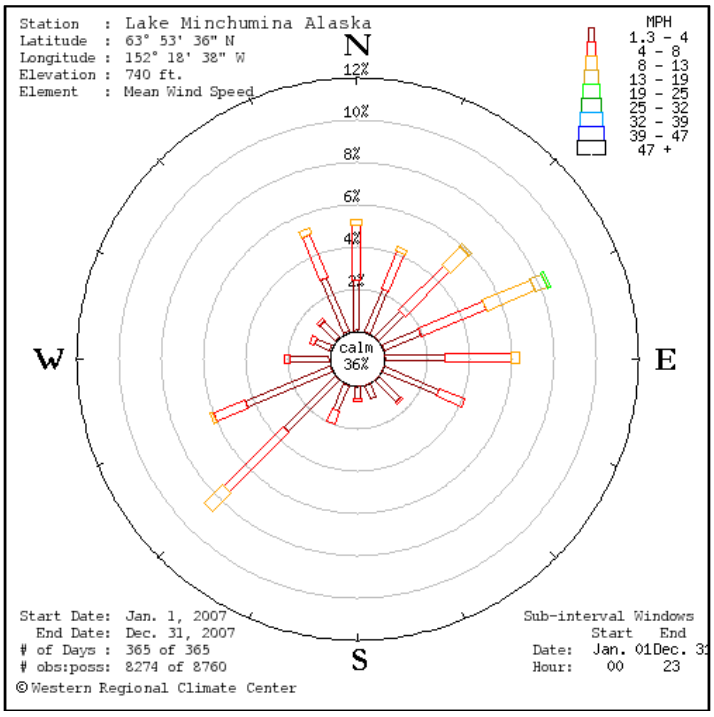
## Wonder Lake Alaska

| | Solar Radiation | Mean Wind Speed | Mean Wind Direction | Maximum Wind Gust | Average Air Temperature | | | Ave Fuel Temp | | | Average Relative Humidity | | | Precipitation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | ly | mph | Deg | mph | Deg F | | | Deg F | | | % | | | in |
| mm/yyyy | Total | Ave. | Ave. | Max. | Ave. | Max. | Min. | Ave. | Max. | Min. | Ave. | Max. | Min. | Total |
| 01/2007 | 309 | 2 | 84 | 34 | 2 | 49 | -35 | 0 | 50 | -36 | 63 | 90 | 32 | 0 |
| 02/2007 | 1272 | 3 | 43 | 46 | 1 | 43 | -29 | 1 | 39 | -31 | 65 | 98 | 14 | 0 |
| 03/2007 | 5709 | 4 | 39 | 37 | -6 | 42 | -31 | -5 | 52 | -34 | 50 | 80 | 12 | 0 |
| 04/2007 | 10087 | 4 | 61 | 44 | 34 | 58 | 8 | 35 | 69 | 5 | 56 | 99 | 17 | 0 |
| 05/2007 | 11677 | 5 | 28 | 36 | 44 | 73 | 24 | 46 | 86 | 21 | 63 | 100 | 17 | 2 |
| 06/2007 | 12776 | 5 | 28 | 28 | 54 | 76 | 30 | 56 | 90 | 29 | 68 | 100 | 17 | 2 |
| 07/2007 | 10473 | 4 | 35 | 27 | 56 | 74 | 38 | 58 | 88 | 37 | 82 | 100 | 36 | 4 |
| 08/2007 | 9197 | 5 | 6 | 36 | 53 | 75 | 34 | 55 | 85 | 33 | 83 | 100 | 29 | 7 |
| 09/2007 | 5538 | 4 | 42 | 23 | 42 | 65 | 24 | 43 | 73 | 23 | 79 | 100 | 32 | 3 |
| 10/2007 | 2615 | 3 | 55 | 39 | 18 | 40 | -1 | 19 | 49 | 0 | 76 | 100 | 35 | 0 |
| 11/2007 | 497 | 3 | 82 | 41 | 16 | 40 | -10 | 15 | 39 | -11 | 69 | 100 | 39 | 0 |
| 12/2007 | 81 | 3 | 57 | 45 | 4 | 40 | -30 | 3 | 38 | -32 | 66 | 100 | 22 | 0 |



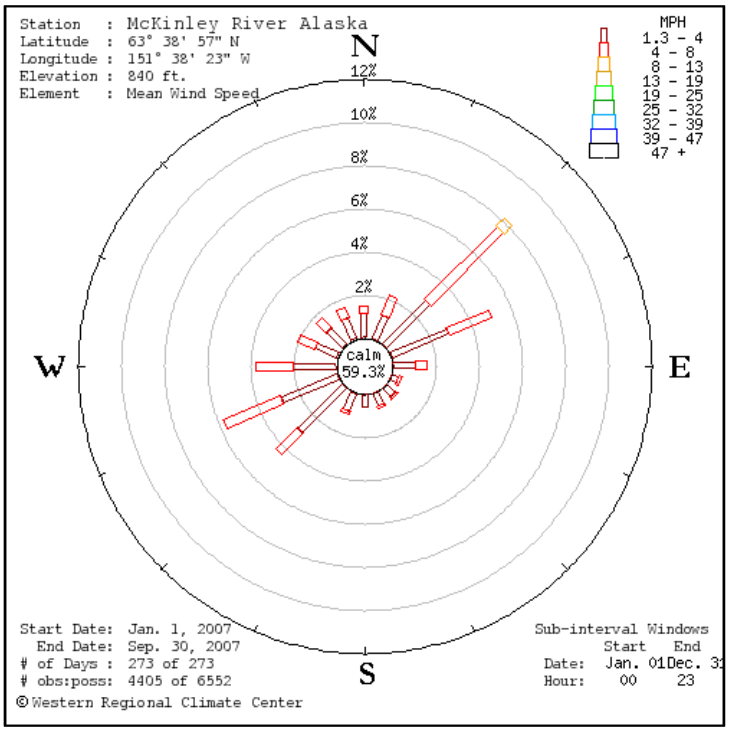
## Lake Minchumina Alaska

| | Solar Radiation | Mean Wind Speed | Mean Wind Direction | Maximum Wind Gust | Average Air Temperature | | | Ave Fuel Temp | | | Average Relative Humidity | | | Precipitation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | ly | mph | Deg | mph | Deg F | | | Deg F | | | % | | | in |
| mm/yyyy | Total | Ave. | Ave. | Max. | Ave. | Max. | Min. | Ave. | Max. | Min. | Ave. | Max. | Min. | Total |
| 01/2007 | 23 | 1 | 312 | 13 | -10 | 29 | -41 | -3 | 22 | -29 | 80 | 97 | 64 | 0 |
| 02/2007 | 1451 | 3 | 35 | 43 | 1 | 26 | -32 | 1 | 19 | -30 | 68 | 95 | 33 | 0 |
| 03/2007 | 4773 | 4 | 28 | 26 | 0 | 40 | -27 | -1 | 31 | -22 | 55 | 89 | 20 | 0 |
| 04/2007 | 10001 | 3 | 50 | 39 | 40 | 63 | 9 | 41 | 83 | 8 | 52 | 99 | 14 | 0 |
| 05/2007 | 13371 | 4 | 165 | 30 | 51 | 83 | 29 | 53 | 91 | 22 | 51 | 99 | 14 | 1 |
| 06/2007 | 9839 | 3 | 277 | 21 | 61 | 86 | 40 | 61 | 98 | 34 | 58 | 100 | 21 | 3 |
| 07/2007 | 13677 | 3 | 242 | 24 | 63 | 87 | 44 | 63 | 101 | 39 | 76 | 100 | 30 | 3 |
| 08/2007 | 9863 | 2 | 275 | 22 | 59 | 83 | 44 | 58 | 91 | 36 | 84 | 100 | 29 | 3 |
| 09/2007 | 5642 | 3 | 337 | 24 | 46 | 71 | 31 | 45 | 76 | 25 | 84 | 100 | 45 | 2 |
| 10/2007 | 1203 | 3 | 38 | 29 | 23 | 43 | 10 | 23 | 47 | 1 | 87 | 100 | 56 | 0 |
| 11/2007 | 85 | 2 | 333 | 24 | 11 | 32 | -21 | 11 | 32 | -13 | 88 | 100 | 64 | 0 |
| 12/2007 | 76 | 3 | 350 | 52 | 0 | 33 | -42 | 3 | 24 | -31 | 74 | 100 | 20 | 0 |



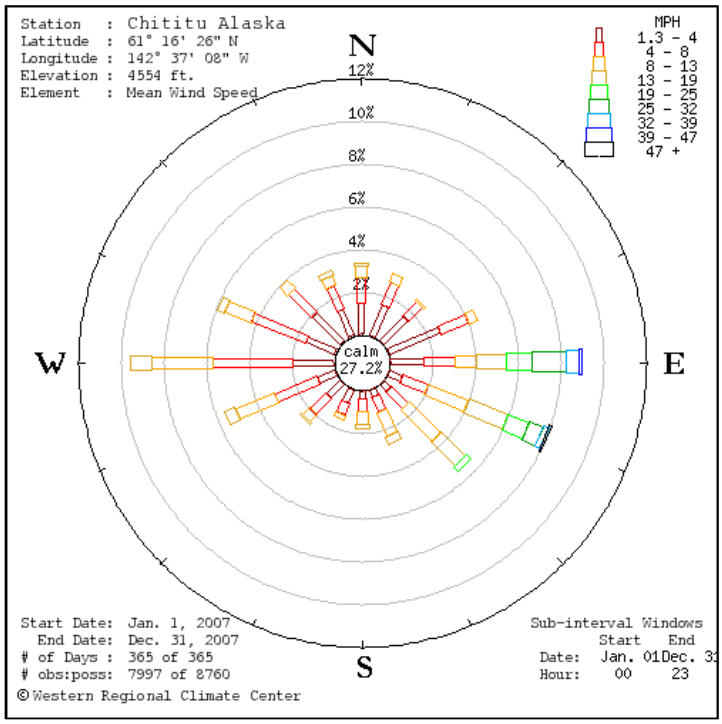
## McKinley River Alaska

| | Solar Radiation | Mean Wind Speed | Mean Wind Direction | Maximum Wind Gust | Average Air Temperature | | | Ave Fuel Temp | | | Average Relative Humidity | | | Snow Depth | Precipitation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | ly | mph | Deg | mph | Deg F | | | Deg F | | | % | | | in | in |
| mm/yyyy | Total | Ave. | Ave. | Max. | Ave. | Max. | Min. | Ave. | Max. | Min. | Ave. | Max. | Min. | Ave. | Total |
| 01/2007 | 21 | 0 | 178 | 9 | -18 | 15 | -46 | -11 | 13 | -37 | 70 | 93 | 50 | m | 0 |
| 02/2007 | 160 | 0 | 99 | 29 | -9 | 23 | -46 | -7 | 18 | -41 | 69 | 97 | 40 | 10 | 0 |
| 03/2007 | 2519 | 2 | 83 | 52 | -6 | 36 | -41 | -8 | 27 | -41 | 56 | 91 | 22 | 12 | 0 |
| 04/2007 | 7552 | 2 | 91 | 21 | 36 | 62 | -6 | 35 | 75 | -7 | 60 | 100 | 15 | 4 | 1 |
| 05/2007 | 11328 | 2 | 176 | 24 | 49 | 81 | 19 | 51 | 95 | 17 | 57 | 100 | 1 | 0 | 1 |
| 06/2007 | 13783 | 2 | 223 | 18 | 37 | 85 | 32 | 60 | 101 | 28 | 8 | 89 | 0 | 2 | 2 |
| 07/2007 | 6926 | 2 | 211 | 18 | 61 | 84 | 36 | 62 | 99 | 34 | 72 | 100 | 26 | 1 | 4 |
| 08/2007 | 2065 | 2 | 236 | 19 | 57 | 75 | 43 | 57 | 87 | 41 | 84 | 100 | 39 | 1 | 2 |
| 09/2007 | m | m | m | m | m | m | m | m | m | m | m | m | m | m | m |
| 10/2007 | m | m | m | m | m | m | m | m | m | m | m | m | m | m | m |
| 11/2007 | m | m | m | m | m | m | m | m | m | m | m | m | m | m | m |
| 12/2007 | m | m | m | m | m | m | m | m | m | m | m | m | m | m | m |



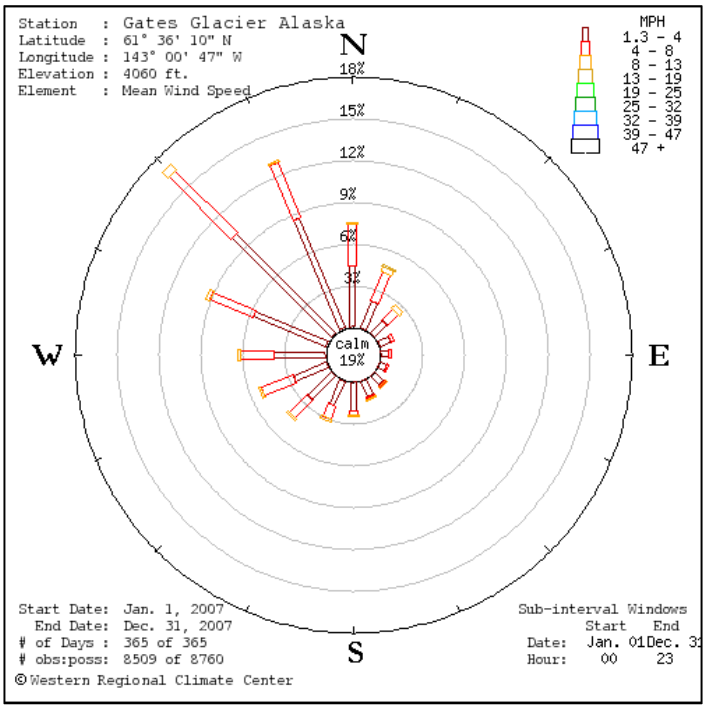
## Chititu Alaska

| | Solar Radiation | Mean Wind Speed | Mean Wind Direction | Maximum Wind Gust | Average Air Temperature | | | Ave Fuel Temp | | | Average Relative Humidity | | | Snow Depth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | ly | mph | Deg | mph | Deg F | | | Deg F | | | % | | | in |
| mm/yyyy | Total | Ave. | Ave. | Max. | Ave. | Max. | Min. | Ave. | Max. | Min. | Ave. | Max. | Min. | Ave. |
| 01/2007 | 740 | 15 | 92 | 61 | 16 | 47 | -23 | 18 | 24 | 12 | 67 | 96 | 15 | m |
| 02/2007 | 1818 | 6 | 331 | 32 | 8 | 47 | -24 | 13 | 23 | 0 | 67 | 97 | 15 | m |
| 03/2007 | 6765 | 9 | 328 | 48 | 1 | -26 | -28 | 7 | 12 | 0 | 68 | 94 | 23 | m |
| 04/2007 | 11651 | 6 | 85 | 75 | 28 | 40 | 15 | 20 | 31 | 11 | 54 | 96 | 26 | m |
| 05/2007 | 11820 | 7 | 176 | 29 | 35 | 52 | 24 | 32 | 39 | 30 | 71 | 99 | 22 | m |
| 06/2007 | 15351 | 7 | 302 | 28 | 47 | 61 | 33 | 38 | 41 | 35 | 59 | 99 | 24 | m |
| 07/2007 | 10811 | 5 | 277 | 27 | 47 | 62 | 37 | 39 | 44 | 34 | 52 | 100 | 0 | m |
| 08/2007 | 10900 | 5 | 286 | 25 | 48 | 63 | 39 | 43 | 48 | 40 | 77 | 100 | 33 | m |
| 09/2007 | 4684 | 10 | 100 | 57 | 38 | 55 | 28 | 38 | 44 | 33 | 83 | 100 | 37 | m |
| 10/2007 | 1260 | 1 | 359 | 31 | 27 | 35 | 0 | 32 | 33 | 32 | 13 | 100 | 0 | m |
| 11/2007 | 570 | 4 | 0 | 0 | 24 | 34 | 12 | 29 | 32 | 23 | 6 | 69 | 0 | m |
| 12/2007 | 209 | 0 | 0 | 0 | 15 | 30 | -16 | 21 | 25 | 14 | 3 | 46 | 0 | m |



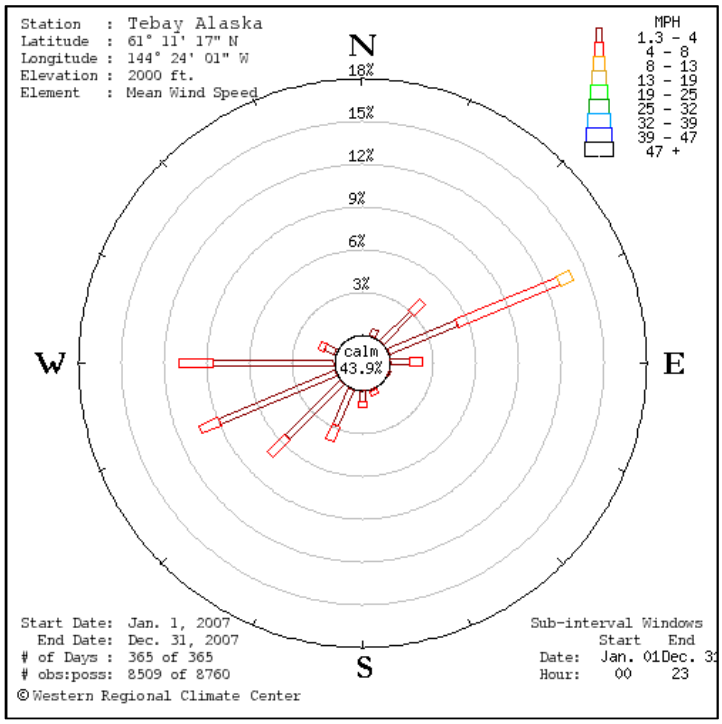
## Gates Glacier Alaska

| | Solar Radiation | Mean Wind Speed | Mean Wind Direction | Maximum Wind Gust | Average Air Temperature | | | Average Soil Temperature - 20 Inches | | | Average Relative Humidity | | | Snow Depth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | ly | mph | Deg | mph | Deg F | | | Deg F | | | % | | | in |
| mm/yyyy | Total | Ave. | Ave. | Max. | Ave. | Max. | Min. | Ave. | Max. | Min. | Ave. | Max. | Min. | Ave. |
| 01/2007 | 719 | 4 | 329 | 25 | 17 | 49 | -20 | 30 | 32 | 0 | 71 | 97 | 18 | 37 |
| 02/2007 | 2505 | 2 | 324 | 15 | 8 | 49 | -23 | 30 | 31 | 30 | 72 | 97 | 18 | 37 |
| 03/2007 | 7206 | 3 | 316 | 24 | 4 | 29 | -22 | 29 | 31 | 29 | 66 | 95 | 20 | 42 |
| 04/2007 | 13246 | 3 | 309 | 23 | 29 | 41 | 15 | 31 | 31 | 30 | 52 | 97 | 12 | 43 |
| 05/2007 | 13515 | 3 | 272 | 19 | 37 | 54 | 25 | 31 | 31 | 31 | 67 | 99 | 18 | 27 |
| 06/2007 | 16760 | 3 | 271 | 19 | 49 | 63 | 33 | 46 | 63 | 31 | 55 | 99 | 19 | 2 |
| 07/2007 | 14346 | 3 | 264 | 16 | 48 | 62 | 37 | 54 | 65 | 44 | 73 | 100 | 28 | 7 |
| 08/2007 | 11440 | 2 | 280 | 19 | 49 | 64 | 39 | 52 | 63 | 43 | 67 | 100 | 24 | 3 |
| 09/2007 | 5244 | 3 | 305 | 22 | 38 | 55 | 29 | 41 | 59 | 0 | 80 | 100 | 37 | 4 |
| 10/2007 | 2456 | 3 | 333 | 33 | 26 | 38 | 9 | 33 | 34 | 33 | 78 | 100 | 42 | 15 |
| 11/2007 | 1044 | 4 | 329 | 29 | 25 | 38 | 13 | 33 | 34 | 32 | 67 | 99 | 9 | 24 |
| 12/2007 | 324 | 4 | 330 | 47 | 19 | 34 | -10 | 32 | 34 | 32 | 67 | 99 | 16 | 44 |



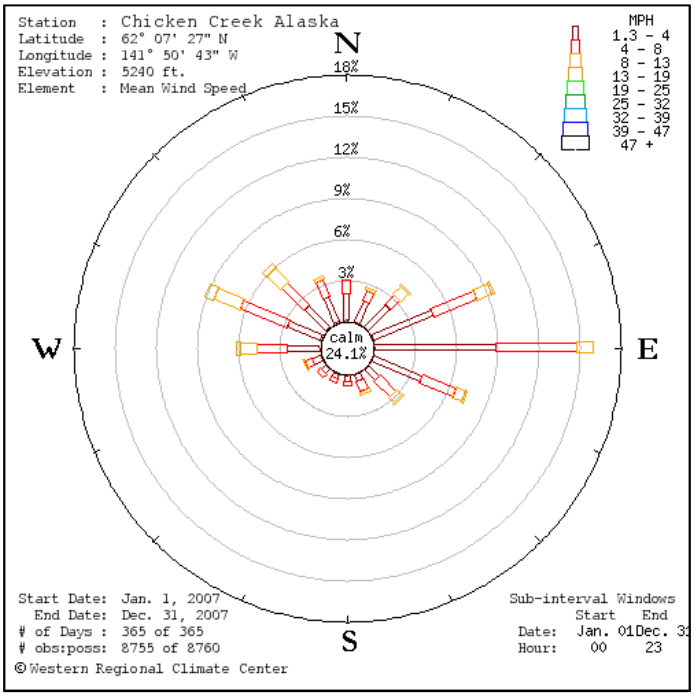
## Tebay Alaska

| | Solar Radiation | Mean Wind Speed | Mean Wind Direction | Maximum Wind Gust | Average Air Temperature | | | Average Soil Temperature - 20 Inches | | | Average Relative Humidity | | | Snow Depth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | ly | mph | Deg | mph | Deg F | | | Deg F | | | % | | | in |
| mm/yyyy | Total | Ave. | Ave. | Max. | Ave. | Max. | Min. | Ave. | Max. | Min. | Ave. | Max. | Min. | Ave. |
| 01/2007 | 151 | 2 | 64 | 31 | 14 | 35 | -27 | 29 | 29 | 29 | 92 | 99 | 73 | 38 |
| 02/2007 | 2067 | 3 | 69 | 14 | 8 | 38 | -25 | 29 | 29 | 28 | 74 | 98 | 20 | 41 |
| 03/2007 | 6921 | 4 | 79 | 15 | 6 | 33 | -16 | 27 | 28 | 26 | 64 | 97 | 35 | 41 |
| 04/2007 | 12406 | 1 | 203 | 14 | 31 | 46 | 0 | 29 | 31 | 27 | 69 | 100 | 28 | 31 |
| 05/2007 | 13473 | 2 | 241 | 10 | 41 | 60 | 28 | 34 | 46 | 31 | 71 | 99 | 23 | 4 |
| 06/2007 | 16476 | 3 | 251 | 12 | 51 | 75 | 32 | 49 | 62 | 38 | 68 | 99 | 14 | 1 |
| 07/2007 | 12902 | 3 | 250 | 12 | 53 | 75 | 36 | 53 | 68 | 46 | 76 | 100 | 28 | 2 |
| 08/2007 | 10912 | 2 | 239 | 9 | 52 | 71 | 35 | 53 | 68 | 0 | 81 | 100 | 24 | 2 |
| 09/2007 | 5668 | 2 | 151 | 9 | 43 | 60 | 28 | 46 | 59 | 38 | 88 | 100 | 40 | 2 |
| 10/2007 | 2064 | 1 | 96 | 59 | 30 | 46 | 13 | 35 | 42 | 32 | 88 | 100 | 45 | 4 |
| 11/2007 | 183 | 1 | 82 | 10 | 22 | 36 | 0 | 33 | 33 | 0 | 93 | 100 | 75 | 24 |
| 12/2007 | 35 | 1 | 50 | 10 | 11 | 33 | -16 | 32 | 33 | 32 | 88 | 100 | 50 | 35 |



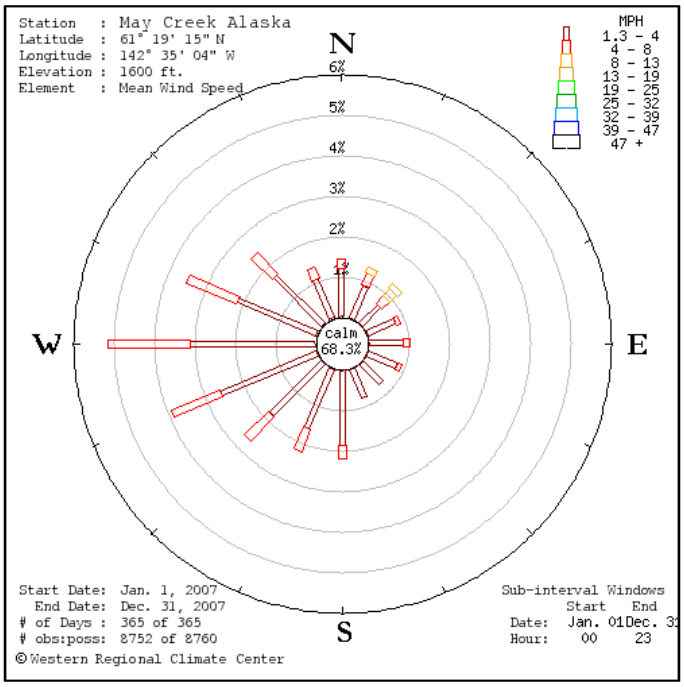
## Chicken Creek Alaska

| | Solar Radiation | Mean Wind Speed | Mean Wind Direction | Maximum Wind Gust | Average Air Temperature | | | Average Soil Temperature - 20 Inches | | | Average Relative Humidity | | | Snow Depth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | ly | mph | Deg | mph | Deg F | | | Deg F | | | % | | | in |
| mm/yyyy | Total | Ave. | Ave. | Max. | Ave. | Max. | Min. | Ave. | Max. | Min. | Ave. | Max. | Min. | Ave. |
| 01/2007 | 777 | 4 | 65 | 25 | 11 | 43 | -30 | 19 | 21 | 18 | 59 | 92 | 13 | 6 |
| 02/2007 | 2166 | 2 | 44 | 29 | 3 | 45 | -28 | 19 | 20 | 16 | 68 | 96 | 15 | 7 |
| 03/2007 | 6611 | 2 | 63 | 26 | -4 | 24 | -34 | 13 | 15 | 13 | 62 | 90 | 20 | 6 |
| 04/2007 | 12486 | 4 | 66 | 30 | 26 | 40 | 10 | 17 | 21 | 14 | 53 | 97 | 19 | 5 |
| 05/2007 | 14348 | 5 | 4 | 23 | 36 | 53 | 24 | 25 | 29 | 21 | 62 | 98 | 18 | 5 |
| 06/2007 | 13950 | 6 | 12 | 28 | 47 | 58 | 31 | 31 | 34 | 29 | 58 | 97 | 18 | 1 |
| 07/2007 | 11731 | 5 | 317 | 28 | 48 | 58 | 37 | 37 | 40 | 34 | 75 | 100 | 28 | 1 |
| 08/2007 | 11255 | 5 | 329 | 20 | 48 | 65 | 37 | 38 | 40 | 37 | 64 | 99 | 26 | 0 |
| 09/2007 | 6002 | 4 | 60 | 28 | 36 | 58 | 21 | 35 | 37 | 32 | 76 | 100 | 20 | 1 |
| 10/2007 | 3119 | 3 | 73 | 23 | 21 | 36 | 1 | 31 | 32 | 31 | 74 | 99 | 38 | 6 |
| 11/2007 | 1181 | 3 | 62 | 29 | 20 | 32 | 6 | 30 | 31 | 29 | 60 | 97 | 22 | 8 |
| 12/2007 | 343 | 3 | 57 | 31 | 9 | 28 | -28 | 26 | 29 | 24 | 65 | 97 | 13 | 9 |



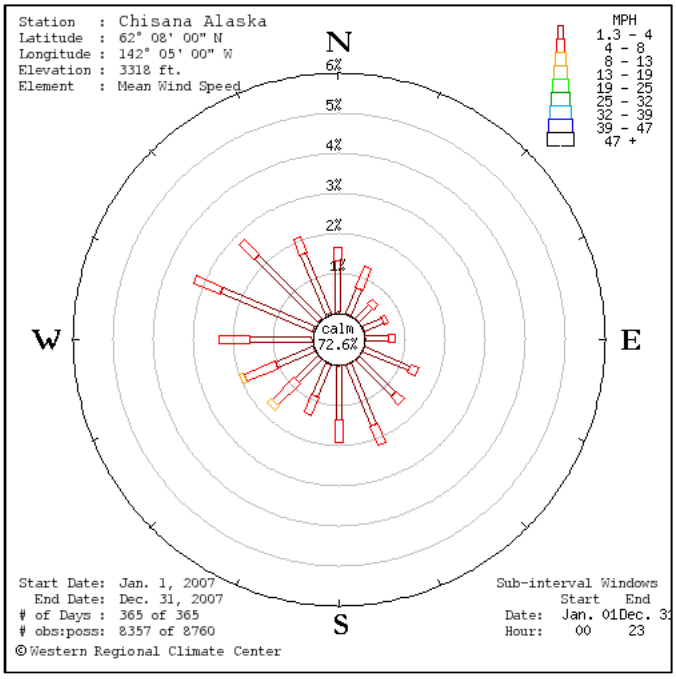
## May Creek Alaska

| | Solar Radiation | Mean Wind Speed | Mean Wind Direction | Maximum Wind Gust | Average Air Temperature | | | Ave Fuel Temp | | | Average Relative Humidity | | | Snow Depth | Precipitation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | ly | mph | Deg | mph | Deg F | | | Deg F | | | % | | | in | in |
| mm/yyyy | Total | Ave. | Ave. | Max. | Ave. | Max. | Min. | Ave. | Max. | Min. | Ave. | Max. | Min. | Ave. | Total |
| 01/2007 | 185 | 1 | 156 | 24 | 6 | 38 | -42 | 7 | 26 | -35 | 79 | 91 | 38 | 14 | 0 |
| 02/2007 | 1516 | 1 | 142 | 17 | 0 | 31 | -45 | 5 | 24 | -28 | 71 | 90 | 25 | 16 | 0 |
| 03/2007 | 5581 | 2 | 207 | 31 | 4 | 44 | -39 | 6 | 28 | -22 | 58 | 83 | 21 | 17 | 0 |
| 04/2007 | 13192 | 2 | 203 | 23 | 35 | 58 | -7 | 35 | 74 | 1 | 51 | 89 | 11 | 9 | 0 |
| 05/2007 | 13267 | 2 | 213 | 16 | 45 | 73 | 23 | 48 | 88 | 22 | 58 | 92 | 11 | 0 | 1.74 |
| 06/2007 | 17769 | 2 | 238 | 29 | 57 | 83 | 26 | 62 | 105 | 25 | 50 | 91 | 13 | 4 | 0.77 |
| 07/2007 | 14478 | 1 | 216 | 19 | 58 | 81 | 33 | 62 | 101 | 33 | 62 | 92 | 20 | 4 | 1.24 |
| 08/2007 | 13039 | 1 | 202 | 16 | 54 | 84 | 26 | 58 | 99 | 25 | 64 | 93 | 17 | 2 | 0.44 |
| 09/2007 | 6089 | 1 | 178 | 19 | 43 | 68 | 19 | 45 | 84 | 18 | 78 | 99 | 26 | 1 | 4.00 |
| 10/2007 | 2981 | 1 | 190 | 17 | 27 | 51 | 1 | 28 | 63 | -1 | 84 | 99 | 42 | m | 1 |
| 11/2007 | 923 | 1 | 181 | 18 | 15 | 41 | -20 | 16 | 46 | -13 | 86 | 99 | 51 | m | 0 |
| 12/2007 | 167 | 1 | 97 | 32 | 3 | 30 | -22 | 5 | 29 | -16 | 81 | 96 | 32 | m | 0 |



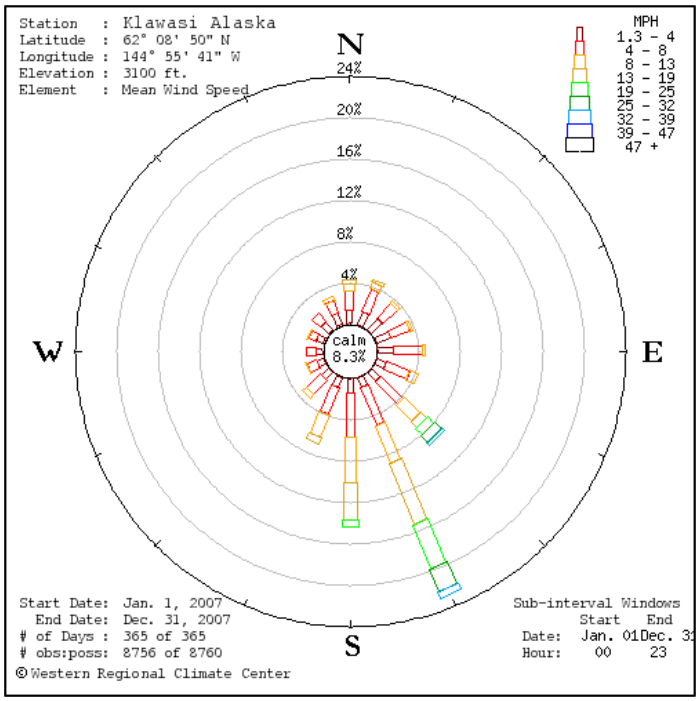
## Chisana Alaska

| | Solar Radiation | Mean Wind Speed | Mean Wind Direction | Maximum Wind Gust | Average Air Temperature | | | Ave Fuel Temp | | | Average Relative Humidity | | | Snow Depth | Precipitation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | ly | mph | Deg | mph | Deg F | | | Deg F | | | % | | | in | in |
| mm/yyyy | Total | Ave. | Ave. | Max. | Ave. | Max. | Min. | Ave. | Max. | Min. | Ave. | Max. | Min. | Ave. | Total |
| 01/2007 | 82 | 1 | 116 | 19 | -5 | 32 | -43 | -5 | 22 | -37 | 74 | 92 | 50 | 10 | 0.00 |
| 02/2007 | 448 | 0 | 129 | 9 | -6 | 29 | -50 | 1 | 24 | -21 | 68 | 95 | 33 | 11 | 0.00 |
| 03/2007 | 3721 | 1 | 113 | 19 | -7 | 36 | -49 | 1 | 29 | -17 | 54 | 85 | 18 | 13 | 0.00 |
| 04/2007 | 12342 | 2 | 128 | 18 | 29 | 56 | -15 | 29 | 64 | -5 | 52 | 97 | 10 | 9 | 0.20 |
| 05/2007 | 13248 | 2 | 139 | 19 | 43 | 69 | 19 | 43 | 83 | 15 | 60 | 100 | 13 | 2 | 1.13 |
| 06/2007 | 14842 | 2 | 87 | 23 | 54 | 76 | 23 | 55 | 89 | 20 | 58 | 100 | 14 | m | 1.62 |
| 07/2007 | 13152 | 2 | 159 | 22 | 55 | 76 | 28 | 56 | 90 | 26 | 72 | 100 | 22 | m | 3.72 |
| 08/2007 | 11734 | 1 | 156 | 23 | 51 | 81 | 24 | 53 | 96 | 20 | 67 | 100 | 17 | m | 0.92 |
| 09/2007 | 5879 | 1 | 139 | 18 | 39 | 75 | 15 | 39 | 82 | 11 | 78 | 100 | 24 | m | 1.94 |
| 10/2007 | 2427 | 0 | 142 | 16 | 18 | 46 | -8 | 17 | 54 | -12 | 76 | 100 | 30 | 0 | 0.15 |
| 11/2007 | 629 | 0 | 119 | 11 | 7 | 39 | -19 | 5 | 49 | -25 | 78 | 97 | 33 | 4 | 0.00 |
| 12/2007 | 17 | 0 | 128 | 0 | -8 | 24 | -45 | -10 | 24 | -50 | 74 | 96 | 50 | 7 | 0.00 |



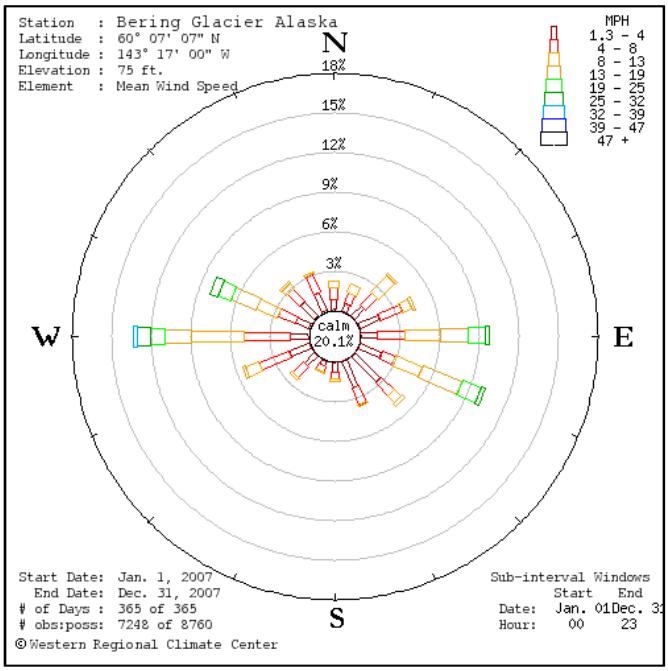
## Klawasi Alaska

| | Solar Radiation | Mean Wind Speed | Mean Wind Direction | Maximum Wind Gust | Average Air Temperature | | | Ave Fuel Temp | | | Average Relative Humidity | | | Precipitation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | ly | mph | Deg | mph | Deg F | | | Deg F | | | % | | | in |
| mm/yyyy | Total | Ave. | Ave. | Max. | Ave. | Max. | Min. | Ave. | Max. | Min. | Ave. | Max. | Min. | Total |
| 01/2007 | 578 | 11 | 147 | 53 | 13 | 45 | -27 | 12 | 43 | -31 | 60 | 94 | 28 | 0.00 |
| 02/2007 | 2224 | 5 | 101 | 35 | 4 | 52 | -26 | 3 | 51 | -34 | 60 | 97 | 19 | 0.00 |
| 03/2007 | 7030 | 7 | 137 | 50 | 1 | 34 | -28 | 0 | 38 | -35 | 50 | 94 | 16 | 0.00 |
| 04/2007 | 12658 | 10 | 155 | 46 | 33 | 51 | 11 | 34 | 63 | 4 | 43 | 99 | 14 | 0.00 |
| 05/2007 | 13539 | 10 | 162 | 39 | 42 | 65 | 25 | 43 | 75 | 22 | 55 | 100 | 14 | 1.25 |
| 06/2007 | 16349 | 9 | 168 | 44 | 54 | 74 | 32 | 55 | 87 | 29 | 48 | 100 | 12 | 1.24 |
| 07/2007 | 13886 | 8 | 176 | 34 | 54 | 76 | 38 | 56 | 90 | 34 | 63 | 100 | 24 | 1.85 |
| 08/2007 | 11904 | 9 | 161 | 39 | 54 | 76 | 36 | 55 | 84 | 32 | 59 | 100 | 22 | 1.14 |
| 09/2007 | 5794 | 10 | 150 | 71 | 42 | 64 | 23 | 42 | 68 | 21 | 67 | 100 | 16 | 4.03 |
| 10/2007 | 3327 | 7 | 123 | 54 | 27 | 41 | 10 | 26 | 45 | 5 | 63 | 89 | 26 | 0.00 |
| 11/2007 | 1076 | 10 | 139 | 54 | 25 | 42 | 1 | 23 | 42 | -4 | 54 | 81 | 17 | 0.00 |
| 12/2007 | 374 | 6 | 139 | 61 | 10 | 38 | -17 | 8 | 36 | -22 | 58 | 83 | 16 | 0.00 |

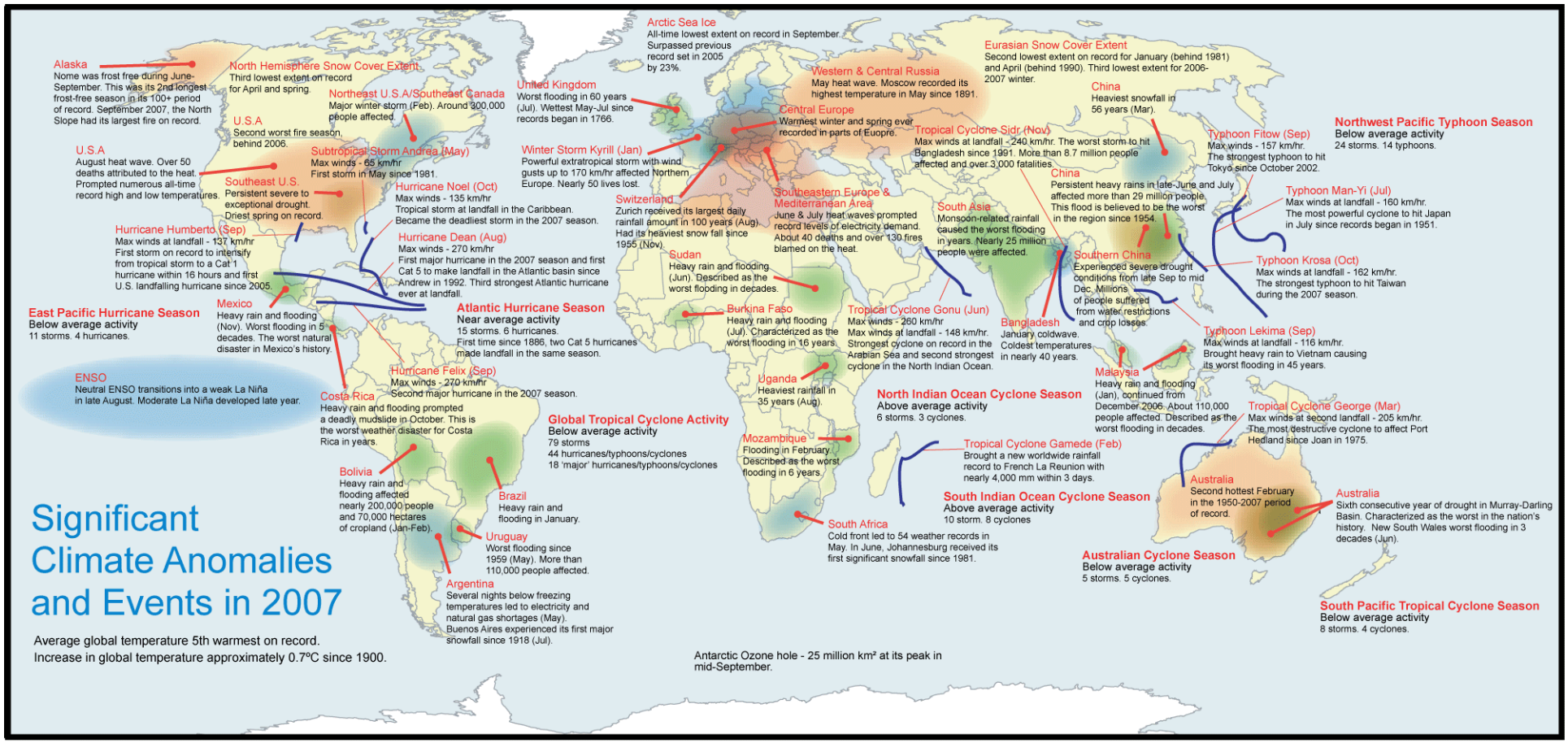


## Bering Glacier Alaska

| | Solar Radiation | Mean Wind Speed | Mean Wind Direction | Maximum Wind Gust | Average Air Temperature | | | Ave Fuel Temp | | | Average Relative Humidity | | | Precipitation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | ly | mph | Deg | mph | Deg F | | | Deg F | | | % | | | in |
| mm/yyyy | Total | Ave. | Ave. | Max. | Ave. | Max. | Min. | Ave. | Max. | Min. | Ave. | Max. | Min. | Total |
| 01/2007 | m | 7.8 | 86.71 | 56 | 28.49 | 41 | -3 | m | m | m | 97.71 | 100 | 59 | 0 |
| 02/2007 | m | 5 | 34 | 43 | 26 | 47 | 1 | m | m | m | 81 | 100 | 20 | 0 |
| 03/2007 | m | 8 | 44 | 60 | 25 | 47 | -1 | m | m | m | 86 | 100 | 30 | 0 |
| 04/2007 | m | 9 | 87 | 66 | 38 | 55 | 9 | m | m | m | 90 | 100 | 39 | 4.45 |
| 05/2007 | m | 8 | 83 | 50 | 45 | 63 | 29 | m | m | m | 94 | 100 | 43 | 3.77 |
| 06/2007 | m | 7 | 44 | 37 | 47 | 64 | 36 | m | m | m | 94 | 100 | 52 | 2.65 |
| 07/2007 | 314 | 2 | 132 | 187 | 48 | 57 | 43 | m | m | m | 89 | 97 | 73 | 0.22 |
| 08/2007 | 6809 | 3 | 142 | 185 | 49 | 66 | 35 | m | m | m | 85 | 98 | 52 | 2.74 |
| 09/2007 | 3646 | 6 | 245 | 184 | 46 | 61 | 30 | m | m | m | 90 | 99 | 54 | 22.21 |
| 10/2007 | 2142 | 7 | 274 | 196 | 39 | 51 | 20 | m | m | m | 88 | 100 | 42 | 13.61 |
| 11/2007 | 696.1 | 10 | 277 | 196 | 46 | 104 | 19 | m | m | m | 91 | 100 | 57 | 0 |
| 12/2007 | 401.8 | 7 | 259 | 197 | 44 | 140 | 2 | m | m | m | 88 | 100 | 37 | 0 |



## Appendix D: Worldwide Significant Climate Anomalies and Events 2007 (NOAA 2007)

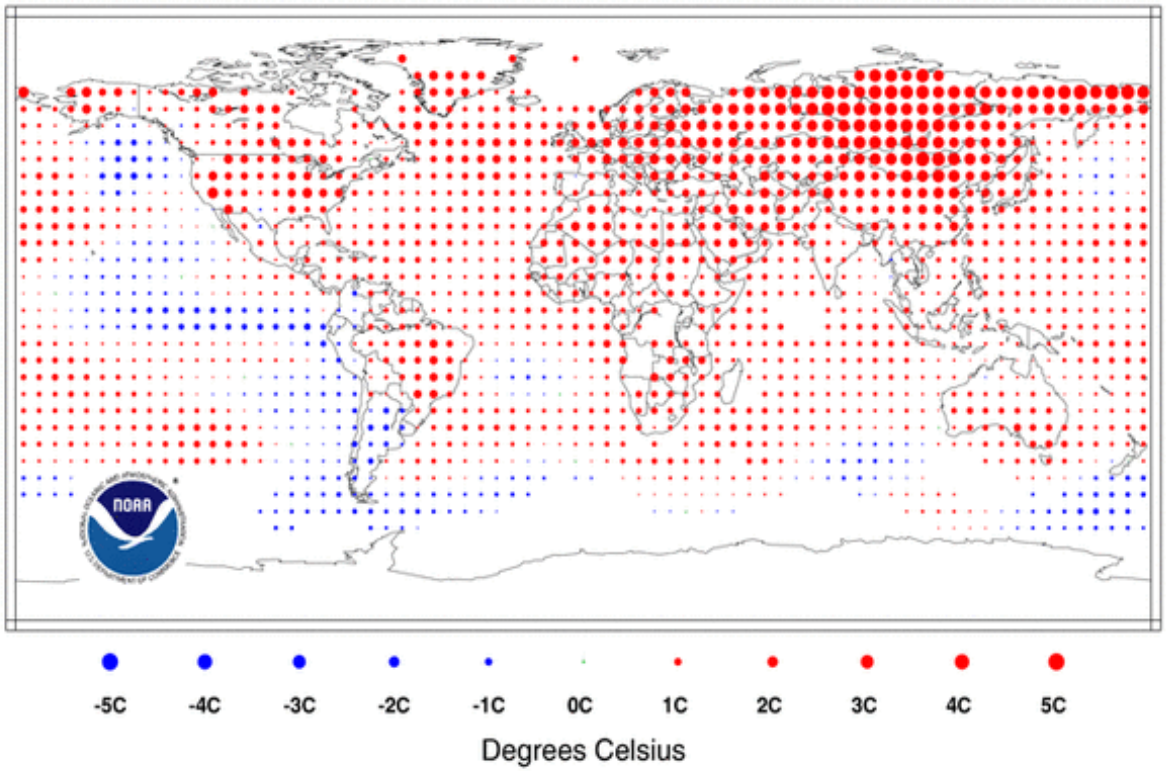



http://www.ncdc.noaa.gov/img/climate/research/2007/ann/significant-extremes2007.gif

# Temperature Anomalies Jan-Dec 2007

(with respect to a 1961-1990 base period)

National Climatic Data Center/NESDIS/NOAA

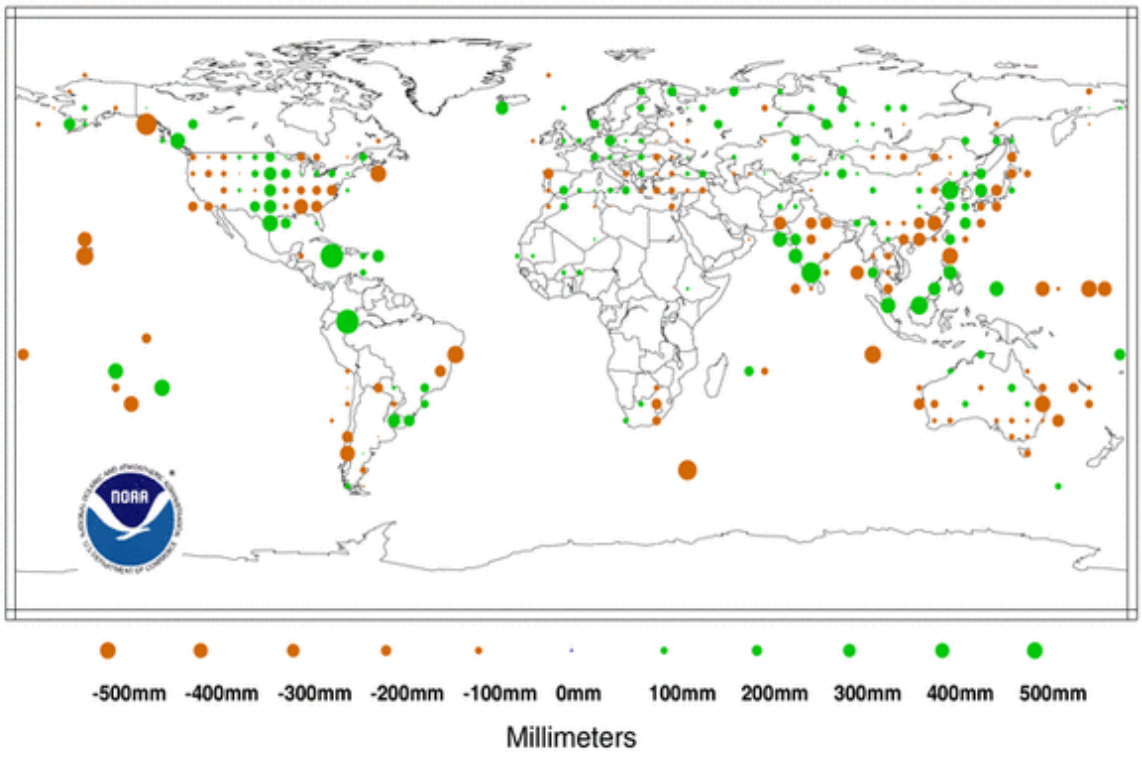



http://www.ncdc.noaa.gov/sotc/?report=global&year=2007&month=13

# Precipitation Anomalies Jan-Dec 2007

(with respect to a 1961-1990 base period)

National Climatic Data Center/NESDIS/NOAA




http://www.ncdc.noaa.gov/sotc/?report=global&year=2007&month=13

# Significant U.S. Weather and Climate Events for 2007


http://www.ncdc.noaa.gov/img/climate/research/2007/ann/alaska_Elemta_01122007_pg.gif.